Urban Sprawl and a Comparative Study Of Housing Morphologies for Oahu

Camryn Jon Bonifacio
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School of Architecture

Urban Sprawl and a Comparative Study Of Interventions for Oahu

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We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in fulfillment as a doctorate project for the degree of Doctor of Architecture in the School of Architecture, University of Hawaii at Manoa.

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Abstract

I find myself waiting in traffic once again. I left my house almost two hours early because traffic was to be expected. The large expanse of highways all over America causes millions of headaches every day. Why do we deal with this? It's almost as if we waste half our life in our cars to go to work, school, grocery store, or even down the street to a friend's house. I never really understood why we do this or how the design of cities and buildings could influence the way we live in them. We need to design a city that pulls us out of our cars and into a much more experiential environment - a city that gives us the ability to walk or ride our bike. This is the issue I decided to explore further in a doctoral thesis.

Urban sprawl, as Merriam-Webster defines it, is *"the spreading of urban developments (as houses and shopping centers) on undeveloped land near a city."* We can find examples of urban sprawl all over America as well as components or evidence of its effects on other areas. As I learned more about this issue, it became evident that there was more to it than simply designing cities from scratch. We find that new development that claims to be better, mixed use, and walkable are still located outside city boundaries and in essence is sprawling out. The evidence of urban sprawl in Hawaii is a major occurrence in Hawaii, partly due to the geographical nature of an island's land mass.

The goal of this research paper is to further understand the issue of urban sprawl in the context of Hawaii's developing suburban communities. Known housing types that are related to sprawl's wide range of problems and forms will be modified to implement ideas from smart growth, Jane Jacobs, and Clarence Perry. Studies will then explore further the impact of different development types on a site located in Kapolei, Hawaii. We will be able to use the study to determine if using known housing types and increasing the quality of life through relieving specific issues related to sprawl, can we redensify a city?

Background/ Field of Study

What causes us as Americans to design the neighborhoods we live in today? Why are Americans highly dependent on the automobile? Since the early days of neighborhood designs and city planning, we have been constantly striving for a better way to improve the way we live. Americans desired to live the "American Dream," the vision of house and land ownership.

The technological advancement of the Industrial Revolution spurred the growth of large factories for mass-production. It also introduced new ways to improve city design and allowed new construction methods to create large-scale neighborhood developments. With new job opportunities, people began to transition from the farm and countryside areas to the urban cityscape. A high demand of housing grew near factories, and people had to build homes quickly. Figure 1 depicts an example of a tenement in New York during the 1900's.

Figure 1 A New York Tenement

At this time, private transportation was only open to the wealthy, and thus the remaining labor force had no choice but to travel on foot. To resolve this issue, tenements, or apartment-like housing, were built close to factories. These neighborhoods resulted in poor living conditions that included cramped and unsanitary living quarters and poor

drainage, which led to many health problems.[1] Anthony Flint mentions the thinking of Jane Addams, as well as writers Edward Bellamy and William Howell, as people who began to envision much cleaner living spaces.[2] The unhealthy conditions of these tenements could only last for so long. In both 1876 and 1901, tenement acts were passed. They pushed for the improvement of these tenements to have ventilation, toilets, and lights.[3] Eventually, the improvements on living conditions of tenements led to the beginning of zoning and planning laws for new homes. The first zoning ordinance used in America began in 1912 in New York City. This was the first time that buildings were assigned to specific zoning ordinances to avoid previous harsh living conditions.

During the 1880's, the invention of electric street cars allowed people to travel further distances.[4] The evolution of motor vehicles allowed people to live further away. This contributed to what later became the decentralization from the city core to surrounding areas. Due to the increased productivity of factories, labor hours were reduced and workers generated more income to spend on housing away from the slums. Highways made their appearance in the mid-1920's, which made it even easier for people to travel by automobile.

Over the next few decades, new factors further boosted decentralization from cities to the suburbs. Previously, it was difficult for people have the opportunity to finance for a home. Banks would require a down payment anywhere from one-third to one-half of the total cost of a home. Short-term mortgages and the inability to make payments on time left homeowners no choice but to re-finance or lose their property.

The Great Depression of the 1930's forced the American government to find new ways to stimulate the economy. Somehow, the demand for housing had to be supplied by introducing more opportunities for home-ownership. The Federal Housing Administration (FHA) made this possible. The FHA made it easier to guarantee mortgages by reducing the risks from no payment to banks. This allowed many banks to

[1] Gillham, Oliver. *The Limitless City* (Washington D.C.: Island Press, 2002), 25-26.
[2] Flint, Anthony. *This Land.* Baltimore: The Johns Hopkins University Press, 2006 page 29
[3] Limmer, Ruth and Andrew Dokart. "The Tenement as History and Housing." THIRTEEN WNET New York Public Media. Accessed November 2012. < http://www.thirteen.org/tenement/eagle.html >
[4] Levy, John M. *Contemporary Urban Planning* (New Jersey: Prentice Hall, 1994), 13.

offer loans of higher values for housing on a financial plan that could extend to as long as 30 years.[5] From here, there became an increase of stable home ownerships.

Furthermore, the ownership of automobiles grew tremendously, and the National Defense Highway Act of 1956 transitioned from the limited-use highway system to the Interstate Highway System. This accommodated millions of automobile owners who lived in the suburbs that had to commute to work in the city.

Today's neighborhoods are an obvious result of the American past to pursue the "American Dream." Young couples and families became attracted to this idea of homeownership as a symbol of success. Another factor that contributed to the desire of suburban living is the undesirable high cost of living in the city.

America currently faces more urban issues such as the luxury of expanding our opportunities for development is decreasing. The population will continue to grow (Figure 2) and our land availability will slowly increase. Our roads are reaching a breaking point; living in the suburban setting has become more inconvenient. Gas prices and housing costs are continuing to increase. Concurrent and rising issues such as these force us to critically re-evaluate our living conditions today.

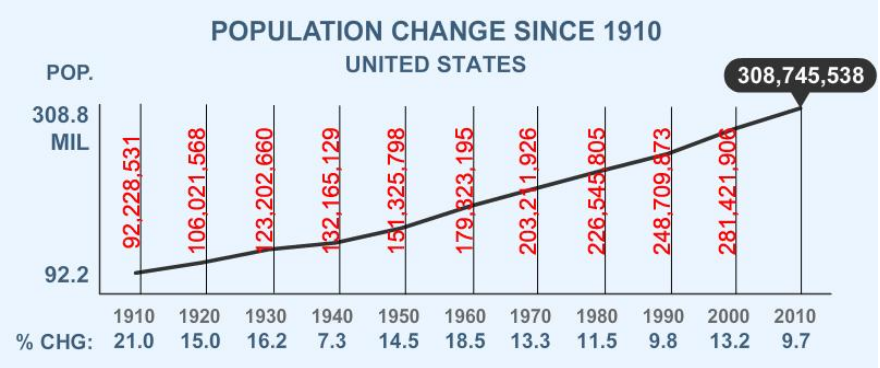

Figure 2 United States Population Growth from 1910 - 2010

Many possible causal factors will be discussed in the first chapter, along with what factors indicate beginning signs of urban sprawl. In the early 1890's, revolutionary planning ideologies the push for more holistic design approaches, such as the need to

[5] Levy, *Contemporary Urban Planning*, 16 -18.

revitalize the quality of life through the eyes of Jane Jacobs, the New Urbanists, and the modern- day “smart growth” principles.

The Death and Life of Great American Cities

Jane Jacobs wrote what many critics believe to be one of the greatest contributions to city planning in the twentieth century. Her book, *The Death and Life of Great American Cities,* focuses on the problems with city planning through observations of her daily life in New York City. She focused on city elements such as sidewalks and parks, the needs for diversity and mixed use, and the causes for decline. She gives insight on why some of these factors work and why some fail in certain urban conditions. Jacobs suggests the idea of regeneration over replacement. The book also goes into depth on how cities begin to decline as well as a few tactics to recover these areas. She wrote *The Death and Life of Great American Cities* during the 1960’s, around the same time of the housing outbreak. Developers searched for untouched areas to develop existing infrastructure and to create connections to existing highway systems.

Revitalization of declining areas is a large existing issue. Urban sprawl has created many problematic situations which have led to decline of many city cores. The city centers are left empty by people who moved into suburban neighborhoods. Increased traffic and monotonous house-lined streets urge for mixed-use integration and increased quality of life. Jacobs describes this decline in terms of unsafe streets and open space while making observations from her home in Greenwich Village, New York.

The “New Urbanists Movement”

The “new urbanists” Movement formed after a group of people became inspired by Jane Jacobs’s ideologies. Started after the post-war boom of housing, they criticized that America cannot sustain any more sporadic growth. The group of “new urbanists” focused on the design of a city or neighborhood at three distinct scales.

The region emphasizes that population diversity, pedestrian access, public space, and the relationship of neighborhoods should be designed evenly around the region.[6] The next scale consists of the neighborhood, district and corridor. At this scale, it is important to distinguish the neighborhood and district using a corridor element. The neighborhood does not only consist of housing, but also shops, civic centers and open space. The district holds certain amenities that are all mixed in with theaters, restaurants, and retail.[7]

The last scale is street, block, and building. Each should be planned delicately as each supports and affects the other. The key for this scale is a well-thought out design that incorporates a public aspect so that they do not stand-alone and wither away.[8]

New Urbanism was one of the first responses to rapid city development later described as today's urban sprawl. It pushed to foster a sense of public space to revive human interaction. New Urbanism pulled ideas from traditional architecture and planning such as the city of Charleston, South Carolina. New Urbanism pushed for a smooth blend of open space and mixed use buildings, making it easier for people to walk rather than use a car.

Smart Growth

The ideas of New Urbanism were taken even further with the introduction of "smart growth." There are many arguments whether the smart growth principles are exactly what will counteract sprawl. At first glance, its principles mimic those of the New Urbanists. It may not be a coincidence that the two ideals are closely related; one of the most influential advocates for smart growth, Andres Duany, started his firm in 1980 by applying new urbanists' principles into urban planning methodologies. With over thirty years of experience, he has written many books on both topics.[9] The principles of smart growth analyze further the principles founded in New Urbanism. Smart growth takes into account the changes that need to be made in the design process and government involvement for the design need of a neighborhood.

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[6] Katz, Peter. *New Urbanism* (New York: McGraw-Hill Inc., 1994), xi.
[7] Ibid xxvi.
[8] Ibid xxii.
[9] "Andres Martin Duany," Duany Plater-Zyberk & Company, accessed September 18, 2011, http://dpz.com/.

Smart Growth Online outlines ten principles that describe its focus. Each of these principles will be analyzed in depth later in this research paper. These principles are:

1 Compact building design,
2 To create a range of housing opportunities,
3 To create walkable neighborhoods,
4 Encourage community and stakeholder collaboration,
5 Foster distinctive and attractive communities with a strong sense of place,
6 Make fair and cost effective development decisions,
7 Mix land uses,
8 Preserve open space and important environmental areas,
9 Provide a variety of transportation choices,
10 And strengthen and direct development towards existing communities.[10]

Duany has pushed these principles further by describing the importance for the attention at the same scales of New Urbanism. Though an idealistic and effect set of principles used widely today in city planning, smart growth continues to be refined.

[10] "Why Smart Growth?," Smart Growth, accessed September 21, 2011, http://smartgrowth.org/.

Project Statement

The goal of this research paper is to develop new ideas and methods on neighborhood design that will hopefully reduce the effect of sprawl in the future. This may not necessarily become specific guidelines to achieve a reformation of sprawled communities, but will discuss methods in which certain urban typologies can be modified to reduce sprawl. By cohesively pulling ideas from many historical minds in the past century, this research paper aims to develop tools to counteract causal factors of urban sprawl.

The main methodology of this research is a comparative study of various housing typologies related to sprawl. Each housing typology, chosen from four different cities around the United States, will be analyzed a controlled urban context. These housing typologies will be theoretically meshed into one urban condition within a city that is currently undergoing ideal urban sprawl. These ideas begin to stimulate design possibilities to create a different urban lifestyle in a suburban neighborhood. Kapolei City in Hawaii was chosen as a location of study.

Urban sprawl is an urgent issue in Hawaii due to its inevitable land constraints. Oahu is also heavily affected by external forces which can increase population numbers much more quickly than in the United States. Among these influences are a large number of people choosing to live and stay in Hawaii. It is understood that urban sprawl may take on many forms because its overall make-up consists of many smaller contributing parts. Taking all of these aspects into consideration, the end goal is to discover a new approach to solving the issues of sprawl. Rather than completely changing the housing typologies and structure, housing design concepts that are research in this study are used to modify chosen types of housing to counteract sprawl.

PART 1
An Introduction to Urban Sprawl

Chapter 1
Identifying "Sprawled" Cities

Most people will describe urban sprawl as a low-density expanse of separated uses. That definition alone is not enough to truly define the spectrum of urban sprawl conditions around America. We want to unravel both physical characteristics of sprawl as well as less noticeable characteristics of sprawl.

Most urban sprawl conditions occur on the outskirts of a city core, and over time, community developments expand further beyond those borders (figure 3). Robert Brugeman describes sprawl as "low-density, scattered, urban development without systematic large-scale or regional public land-use planning." It is also believed that the beginnings of urban sprawl may have existed further back in history than we previously thought it to be.[11] Perhaps, it is human nature to continually expand the city in parallel with population increase, demand for economic resources, and territorial expansion.

[11] Bruegmann, Robert. *Sprawl: A Compact History* (Chicago: The University of Chicago Press, 2005), 18.

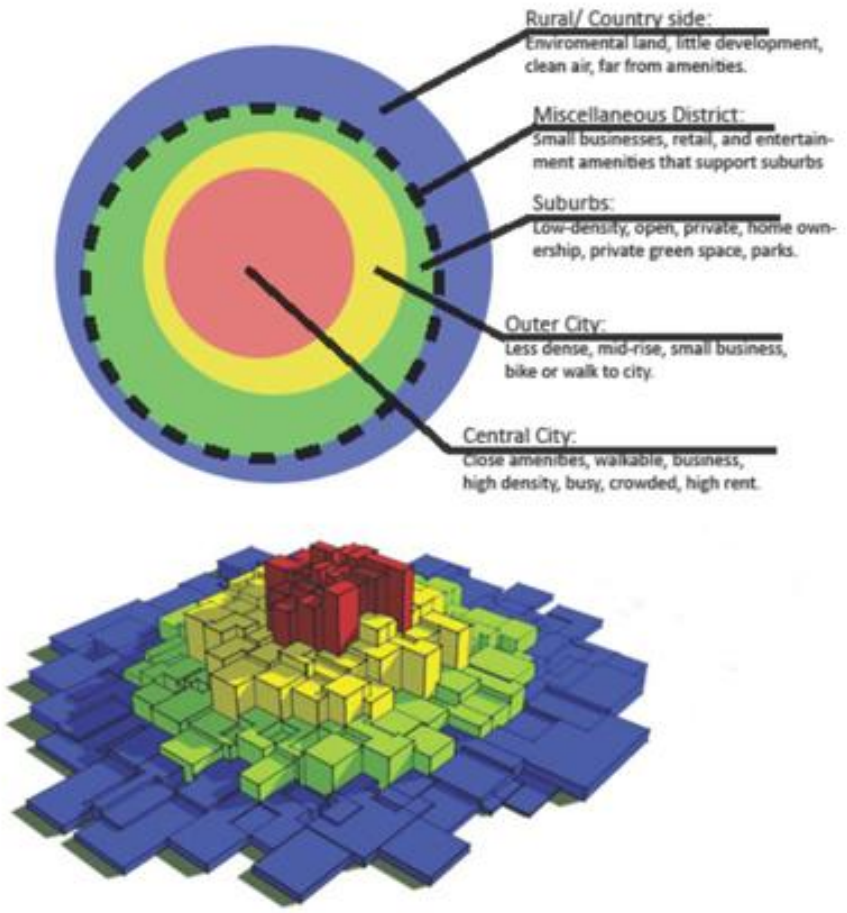

Figure 3 Generic diagram of sprawl and the layers created from the central city.

Physical Characteristics

Urban sprawl has five components, according to Andres Duany, Elizabeth Plater-Zyberk and Jeff Speck: 1) Housing sub-divisions, 2) shopping centers, 3) office parks, 4) civic institutions, and 5) roadways.[12] Due to zoning ordinances in America, there is a distinct separation between these components. Housing and the developments of roads and highways have had the greatest physical contribution. Venues are added to appeal to entertainment purposes. Theme parks, stadiums, theaters, museums, and monuments draw development of shops and restaurants to take advantage of the increased pedestrian traffic. These categories invoke a vast amount of building types and development typologies.

[12] Duany, Andres, Elizabeth Plater-Zyberk and Jeff Speck. *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream* (New York: North Point Press, 2004), 5-7.

Retail amenities apparent in urban sprawl communities are referred to as “big box” retail stores.[13] These are very large stand-alone chain department store such as Best Buy (electronics) and Home Depot (construction materials). Others like Wal-Mart and Target offer a wide range of merchandise from clothing to food. The problem with these types of stores is that they are almost always single-purpose stores located within five minutes of each other. They also require massive storefront asphalt parking to accommodate their customers. Furthermore, they divert customers to shop in corporate businesses, taking away business from local vendors.

Housing is a major component that contributes to urban sprawl. The demand for more massive single-family housing developments continuously increases while many families choose to move to the suburbs from the city center due to the lower cost of living and safer living environments. In conjunction with owning a car, families are able to live much more private lives. The desire for a more natural, greener environment also increases. Many housing developments are being located near bodies of water, forests, and mountainsides. They are also commonly found spreading endlessly looking as if the same house has been rubber stamped street after street.

The last physical component of sprawl is the network of roadways that connect all of the previous components. This includes connections to the expanse of highways. This component has allowed us to commute to anywhere the Continental U.S. We have designed our cities and neighborhoods almost exclusively for the automobile, making it an inconvenience to walk anywhere, even to a nearby park. If we take Los Angeles, California for example, we can see these components in a real-life condition (Figure 4).

[13] Hayden, Dolores. *A Field Guide to Sprawl* (New York: W.W. Norton & Company, 2004), Page 24

Figure 4 Aerial photo of Los Angeles, California.
Downtown Los Angeles is viewed in the background.

By describing these immediate components of sprawl, we also describe physical characteristics at a larger scale. These communities appear outside of a city center, and continue to expand, filling the space between other communities that are simultaneously expanding until the gap is filled. There is need for expansion, but at what rate? Some statistics show that we are expanding much faster than we need to. Between 1970 and 1990 we see that Los Angeles grew in population by 45 percent, while developed land area grew by 300 percent. Another example is Cleveland, which lost 11 percent of the population during the same time period, but land area grew 33 percent.[14]

Other Components

There are other factors that may not be an immediate representation of sprawl, but over time, some may arise. In some cases sprawl, can begin to show the separation of income classes and race. We see communities that tend to create centers of people with the same income levels. This also means we begin to see centers of poverty form when the cost of housing becomes unreachable. There is evidence drawn from the high-income neighborhoods. Individuals of similar income levels tend to be attracted to the same places, this also holds true for most communities and ethnicity groups.

One example that illustrates the issue of race is shown in Levittown located near Hempstead, Long island. Designed to accommodate seventy five thousand people, it was one of the first towns of its kind- a housing community using the same housing type

[14] Squires, Gregory. *Urban Sprawl: Causes, Consequences, and Policy Responses* (Washington: The Urban Institute Press, 2002), 25.

with white picket fences, green lawn, and large living rooms. It is geared towards the family of the 1940's with the husband as breadwinner, and wife as a stay-at-home mother. In its promotion, William Levitt explains his view on business as opposed to making the homes open to all races. "Not a matter of prejudice, but a matter of business… by various means, I have come to know that if we sell one house to a Negro family, then 90 – 95% of our white customers will not buy into the community."[15]

In this social phenomenon, many people search for a home in a community that offers them the best amenities for their needs. Many people also feel the need to own a car because it makes commuting more private and convenient. The social norm for transportation and the type of house people desire to live in may be the greatest obstacle in reducing the components of sprawl.

[15] Hayden, Dolores. *Redesigning the American Dream* (New York: Vintage Books, 1989), 23.

Chapter 2
The Beginnings of Urban Sprawl

This chapter studies historical city planning that, overtime, resulted in problematic issues which we see today as the beginnings of urban sprawl. In conjunction with this timeline of development patterns that lead up to sprawl, we can understand an accelerated effect and evidence of sprawl development.

Hawaii has experienced a series of events that has led to the appearance of sprawl. Before the appearance of missionaries, indigenous Hawaiian people lived off the land in small villages divided in *ahupua'as*. Everything they made, ate, or built would come from the land. Today, we see a much more different Hawaii, one that is facing issues similar to what will be discussed in the next few pages.

Cities impacted by sea trade such New York City, Boston, and San Francisco caused a concentration of business and industry development near harbors. For Oahu, it was Honolulu Harbor that became a central core for development because the area was used initially for selling, trading, and buying of goods (figure 5). Between the 1820's to 1850's, people were business owners, had families, and sometimes servants. Though business and trade industries boomed, workers' living conditions were cramped and were close to the sewers.

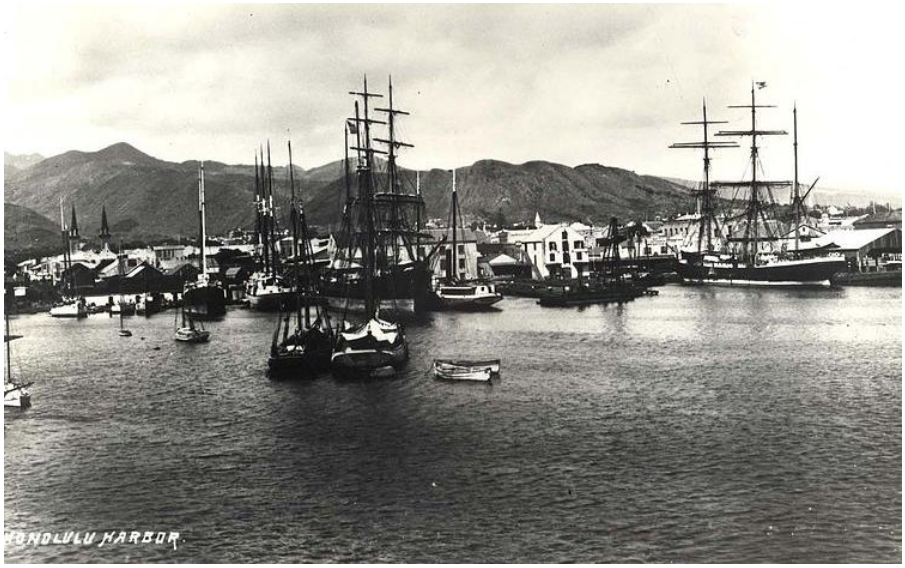

Figure 5 View of the busy Honolulu Harbor in 1881.

During the late 1800's and early 1900's, Hawaii became a land for immigrants hoping to live a better life in America, which influenced the cultural texture of the islands we understand today as Hawaii's "melting pot." Many of these immigrants came to work in plantations and later, many had the option to stay which was when cultures began to mix.[16] When Hawaii became a United States territory in 1900, influences of development occurring in America became apparent on Oahu.[17]

As people became wealthier, they sought to move out of the clustered city and into a more open living condition. Doloris Hayden describes this as the "borderland," a zone that separated city and country, neither rural nor urban.[18] The wealthy chose the single-family home lifestyle as a way of separating themselves from the grime and stresses within in the city. The city was a place for work and makes a profit, while the home was a place for private relaxation.

It is interesting to think that, as we struggle with the long commute times from traffic, the people of this time period struggled with the long commutes to work. They still chose this way of living to get out of the dirty city. One of the things we can compare to today's framework is the relationship of the city to our homes. The city, or urban core, can be looked at as a busy place of work and business during the day, but at night it is not a place we would like to raise our children. Empty, slum, dark, scary, crime and homeless people are some things we can describe the area as in most cases. Yet, with the absence of factories gushing out smoke and better infrastructure to carry away waste, we are not dealing with the same poor living conditions of the 1800's city. There is some distinction, from the past and present, between living in the city and living in a suburban area.

A little after the interest in moving out of the city, architects and landscape designers became interested in the idea of creating developments that incorporated a natural setting. We see examples of this in Llewellyn Park (figure 6), designed to give one a more intimate relationship to nature and discard the troubles of the city. Again described by Hayden as "Picturesque enclaves," more people were living away from the city.[19] They now needed to support them by creating more public transit, leading to a larger

[16] "*Hawaii History"*. Accessed September 18, 2011. Hawaiian-Roots.com blog. 2009 http://www.hawaiian-roots.com/hawaiihistory.htm
[17] *Honolulu: 100 years in the making*. DVD. Produced by Phil Arone. Honolulu, HI: Mountain Apple Company. 2006
[18] Hayden, Dolores. *Building Suburbia* (New York: Pantheon Books, 2003), 22.
[19] Hayden, *Building Suburbia*, 48.

spread of community and neighborhoods around these new transit lines. This continued as a way for businessmen to make large sums of money on plots of land for people who could afford it.

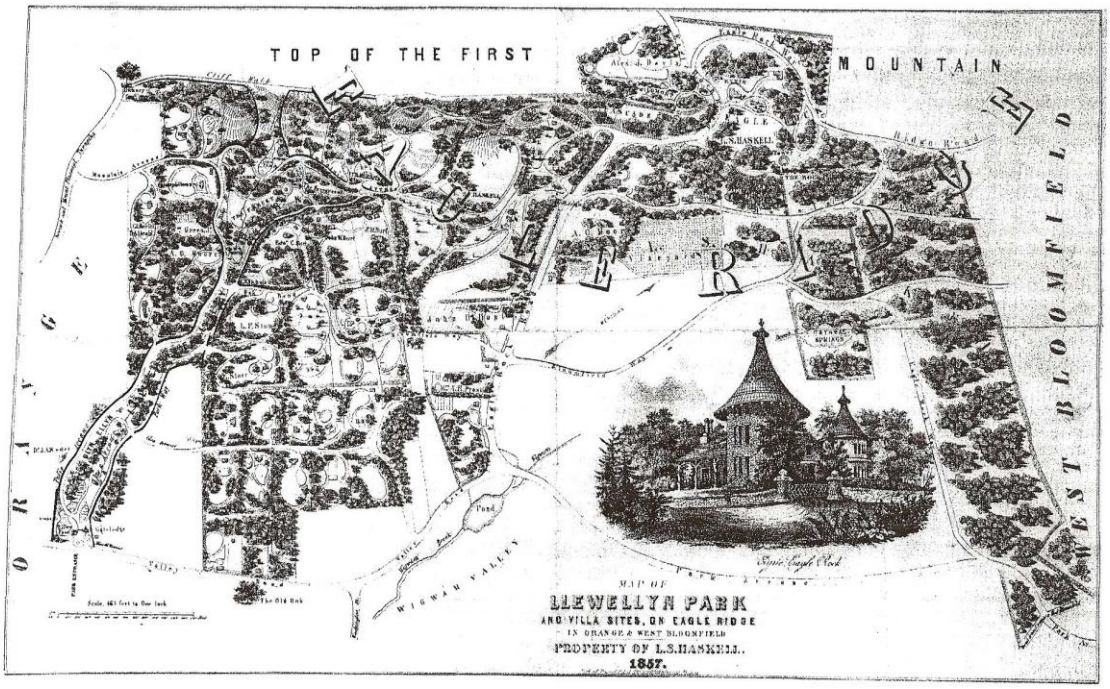

Figure 6 Site plan of Llewellyn Park. Designed by Llewellyn Haskell with the slogan "Country Homes for city people." We can see in the site plan that the plots are much bigger, taking up more land area in order to have the country feeling.

By borrowing the idea of the borderland, the architects and landscape architects not only turned it into an intimate setting with nature, but a way of creating social space within nature as well. We see similar thoughts on combining nature and community living in the "garden city" ideals such as Ebenezer Howard's "Garden City of To-Morrow." Howard described this community as having the best of both town and countryside in a well thought out controlled landscape. Still, we relate this to disregarding the city and spreading out elsewhere, although well thought-out, it was designed to cater to about 30,000 people.[20] Today, multiples of garden cities would be required to support the population of a single area. Roads also need to connect each city. With all the types of entertainment and amenities people use today, a single city could not offer all of these things.

[20] Howard, Ebenezer. *Garden cities of tomorrow* (Cambridge: General Books LLC, 2009), 54.

Developments preceding the Post- World War II era would not be considered sprawl. Although developments extend from the city, they were still relatively close to those centers. A much more different problem arose in 1900's - there was a greater demand for housing, families of multiple generations began to live under one roof and veterans had saved up money, got married and were ready to start their own families.[21]

With this sudden demand for more housing, the Federal Housing Administration (FHA) and the Veterans Administration (VA) were formed to allow the construction of over ten million new homes.[22] These homes were based off what people thought of the "ideal" family to be, head male, a home wife, and two kids. It was during this time that the mass-produced "stamped" homes continue to be stamped elsewhere today. This was an explosive step towards sprawl; the developers were looking to earn quick profit by preparing plots on cheap land outside of the city and creating roads to adapt to irregular topography. Though they were responding to a need for housing, a problem of that time period, it is not an option or .a luxury we can continue to use. We especially see this becoming a large issue in Hawai'i. After the first travelers made it to the islands we see development slowly take its course. Shops get built and the influence of America changes the way the locals live and move about their land.

Businesses were now drawn to these suburbs and along with the rise of the highway system; we begin to see development of grocery stores, fast food restaurants, strip malls, and entertainment centers on these suburbs. These "edge nodes" were surpassed by another movement in the late 1980's, causing people to move into rural fringes.[23]

Almost as if we have come full circle from the initial need to remove ourselves from the busy city centers, this new rush to the rural fringes extended our urban foot print even further. I believe every pattern discussed above has continued to present time as a never-ending loop, leading only to the expansion of its loop. There is a continuing interest in social and economic gains. People are looking for places that both enrich their social interactions or by moving to a more open setting like the picturesque, or privatize their lives and start a new family in the suburbs. Meanwhile, developers take

[21] Hayden, *Building Suburbia*, 132.
[22] Ibid 132.
[23] Ibid 181.

advantage of these migrations by buying cheap land and developing neighborhoods quickly.

Public Policy	Technology	Spatial Conditions	Social Drivers	Philosophies	Other
Zoning	Automobile	Cheap land development	"American Dream"	Industrial vs. country	Rate of Housing Dev.
FHA/VA	Building innovation	Existing and need for roadways	Private transport	City vs. Suburban	
Highway Act	roads	Separate from dirty city and move to open.	Be in nature with healthier interaction	Beauty of the natural landscape	
	Mass transit		Anti-urban		
			Income Level		
			Immigration		

Figure 7 The table above shows a number of drivers for sprawl that are divided into categories. Certain drivers influence others, for example the ability to expand technology through certain policies.

Urban sprawl continues to spread today through a number of factors. Figure 7 lays out a chart of various drivers for sprawl, not all of which will be touched upon in this research paper. This includes economics, social mobility, technology, government decisions, and ethnicity. Robert Bruegmann brings up an interesting look at how economics goes political. From an economic view, there is a simple buyer and seller relationship in the supply and demand for housing. The way that this becomes a political cause is that as individuals look for the best interests to support their family, these same individuals are the ones that vote and support the government leaders that will provide in their best interest.[24] Bruegmann explains a specific situation of an individual living in the city that doesn't want a new building to block his view. Both the city and suburban individuals advocate for their own interests, keeping both building types exclusive to their areas. While city dwellers worry about views and property values, the advocates for the suburban communities keep any type of business and skyscrapers away in fear of increasing traffic and destroying their private way of life.

[24] Bruegmann *Sprawl: A Compact History*. 99

Apart from the social values we have already expressed to fuel sprawl, another factor is racial segregation. We read of one example of racial segregation in the "white flight" to the suburbs.[25] Like the Levittown example, some communities may have been designed to cater towards certain individuals of one race. Different communities are designed for specific income levels, allowing suburban communities to become segregated between groups of specific income levels. Communities of lower value are attractive to immigrants, who are trying to make a living but still want a private life. It could also be suggested that because these individuals come from other countries they choose to populate the same communities to gain a sense of familiarity and comfort ability. In this sense, sprawl fosters the ability for individuals to choose from a variety of communities.

Technology is an interesting driver for sprawl, as there are a lot of technological advancements that could contribute to it. The most obvious example is the automobile, which has allowed individuals to drive at farther distances. Bruegmann explains that the private car and the expanse of highways cannot be direct contributors for the spread of sprawl.[26] Another form of transportation that may have contributed is the train and light rail systems. Although they provide mass transportation and relieve some automobile traffic, they allow for an even wider spread of development. Their transportation lines may run through empty expanses of land that later becomes developed.

Another form of technology that has contributed to sprawl is the innovation in the building process. Gregory Squires brings up an interesting point on how the creation of home air conditioning systems allowed for development in hotter climates.[27] Pre-fabrication houses are another innovation that contributes to the speed at which sprawl is created. The ability to pre-manufacture housing frames has allowed suburbs and new communities to sprout up quicker than ever before.

The last possible contributing factor to sprawl is the government's role in decision and policy-making. Policies that support the building of highways, funding for housing, making loans more attainable to more people, and land-use policies. These decisions led to the spread of developments along the highway, as well as making it easier for people to flee from the city to the suburbs. Land-use policies including zoning make it difficult to mixture different building types on a single plot of land.

[25] Ibid 97
[26] Ibid 108.
[27] Squires, *Urban Sprawl: Causes, Consequences, and Policy Responses* 5.

In Oahu, these influences occur almost simultaneously. This would happen without the influence of many of the development ideas we have gone over. As Honolulu continues to develop, the appearance of the street car allowed the boundaries of Honolulu to expand (figure 8). The train line, spanning most of the island, goes beyond those boundaries. Simultaneously, the population is rising as development is pushing out and we see a higher demand for homes and the beginnings of a tourist industry.[28]

Figure 8 1925 photo of a busy street in downtown Honolulu. The appearance of the street car pushed development beyond the boundaries of the initial developments.

What differentiates Oahu from the continental United States is its tropical location and culture, which allowed its economy to thrive on tourism. In the late 1920's, hotels and shops in Waikiki spurred to feed this new industry that begin to feed this small industry with the little access people outside have to the islands.[29]

In 1959, Hawaii became the 50th state under the presidency of Dwight Eisenhower. From here on the residents of Hawaii, including the indigenous Hawaiians and the descendants of immigrants, begin to become skeptical on what the future holds for its newly found U.S. State. A number of people mention that it will be much harder for them

[28] Honolulu: 100 years in the making
[29] Honolulu: 100 years in the making

to stop development. One gentleman looks back on Hawaii's history in the documentary "Honolulu 100 Years in the Making," and mentions that "buildings came up overnight." [30]

Up to this present day, development in Hawaii has continued to form similarly to the continental U.S. In 1950, researchers estimated Hawaii's growing population to be a mere 400,000 in the year of 2000.[31] The census data in Figure 9 shows that Hawaii's population in year 2000 was over three times its projected population. This is evidence that Hawaii was not only a place for vacation, but a place to live in for incoming visitors. Therefore, Hawaii had to consider the external increase of population over time.

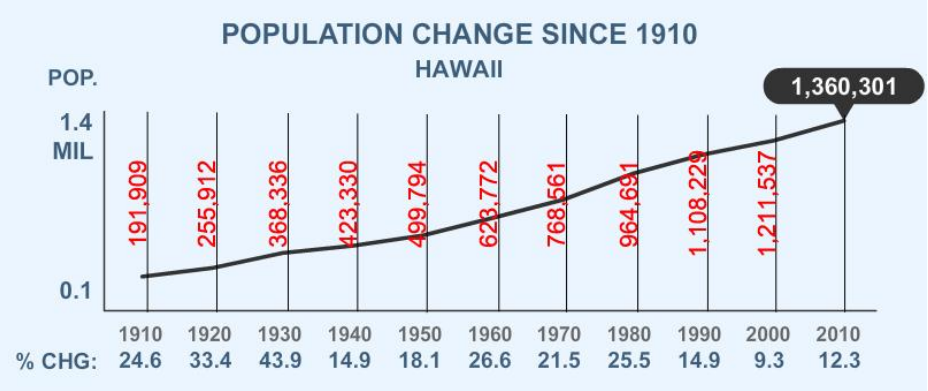

Figure 9 Population growth in Hawaii from 1910 – 2010, from Census Bureau.

[30] Honolulu: 100 years in the making

[31] U.S. Census Bureau. Accessed November 20, 2011. http://www.census.gov/.

Chapter 3

Social and Environmental Issues Associated with Urban Sprawl

So far, the contributing physical components to urban sprawl and its causes occurring in the United States and Hawaii were analyzed. There are many issues that are associated with urban sprawl: cost of living, lack of sociability, traffic, dilapidating communities, and loss of arable lands, segregation of people through income or race, and health issues. Before we go in depth, let's briefly take a look at the positive side of sprawl, and what people believe it is doing for the better of society. There have been countless books and articles relaying the negative effects of sprawl, so let us not go too in-depth on these topics as to just get an idea on the handful of problems that has become evident. The table in Figure 10 depicts a number of issues that can potentially result from urban sprawl. Some may be further off the mark than others, but through the research process, these are the issues that came up.

Public Policy	Health	Spatial Conditions	Social	Cost	Unsustainable
Zoning	Poor air quality	Low-Density	Separation of race or social class	New Infrastructure	Rate of Housing Dev.
Red-Lining	No walking	Distance between home and destination	Private transport	Gas costs	Heat islanding
		City vs. Suburb	Can lose a sense of safety	Heat Islanding – Higher A/C costs	Storm water runoff
		Creation of slums	Anti-urban		Can tap into other land-use
			Income Level hierarchy		pollution
			Household types		

Figure 10 Issues potentially related to urban sprawl.

In previous chapters, the topic of zoning came up as a force for increasing sprawl. We also mentioned that zoning was used as a tool for separating housing and work so that the pollution caused by industrial factories would not infiltrate the living areas. Today,

most work cannot be associated with that of the industrial era. Besides large warehouse and factory-like business, places of work can blend in seamlessly with places of living.

When the topic of urban sprawl is brought into conversation, there is definitely negative connotation to the word. Amongst the negativity, positive aspects should somewhat justify the existence of urban sprawl. The post-war era as described earlier, led to a rise in population, wealth, and options for housing away from the busy city life. The search for freedom and the "American Dream," as Oliver Gillham mentions, still holds true today. The automobile allows people to live where they want and how far they want to travel as they please. A 1999 survey conducted by the National Association of Home Builders (NAHB) concludes that eighty-three percent of people surveyed would prefer to live in a detached single family home located in an outlying suburb.[32]

Pro-urban sprawl idealists also argue that, although sprawl has consumed millions of acres of land, it is merely five percent of the nation's land mass. They also state that it takes nearly fifteen years of development to consume one percent of our land availability. Unlike dense urban areas, pollution and traffic often associated with sprawl areas are lower.[33] Although many of these facts may be true, we must take a look at the overall picture. Land consumption may not be a threat for the greater Americas, but for islands such as Hawaii, the issue of land consumption is more alarming. Looking at this issue from a wider perspective, problems grow between regions of urban sprawl instead of one region.

Although the facts state that a very small percentage of our land is occupied by the built environment, what is the actual make-up of land that remains? Going back to Robert Bruegmans's research, titled "limits to growth," this section introduces positive points about how mankind is on the verge of consuming all natural resources available. Resources cannot be unlimited because people are already suffering, and by taking more space for development, more resources are becoming depleted.[34] Though availability of land is not an issue, it is assumed that what we are doing now is not efficient. One side will say "we have lots of room," and the other side will say "we are running out of room to develop." Rather than looking at both sides for factual evidence,

[32] Gillham, The Limitless City: A Primer on the Urban Sprawl Debate, 69.
[33] Gillham, The Limitless City: A Primer on the Urban Sprawl Debate, 78.
[34] Bruegman, Sprawl: A Compact History, 129.

the fact is that land is limited. Sometime down the line, there will be no room for new developments, whether it is for agricultural purpose or urban development. We can see that capacity and a need to reduce some strain by other problems caused by sprawl are needed now before developers plan for more urban sprawl communities.

This same idea goes for Oahu as well; although there is much potential land for development, the prime real estate comes in the form of agricultural land. This is becoming a large issue in the recent 2012 race for Mayor as members of the Sierra Club describes. Anthony Aalto, the Chair for Hawaii division of the Sierra Club mentions that we have 3150 acres of prime farm land of which 2300 would be taken for new developments.[35]

The next argument is made by a few urban sprawl supports that consist of respected professors in academia. Samuel Staley of the Reason Public Policy Institute and Randal O'toole of the Thoreau Institute both believe that traffic congestion and pollution are unrelated to sprawl type development.[36] According to O'toole, data gathered from the Environmental Protection Agency show a relationship between population density and traffic/ pollution. He shows that as density increases in most cases, traffic and pollution also increase. He says that although higher densities would promote alternative transportation methods and carpooling, a majority of people still commute by private vehicle.[37] They further argue that while density may reduce the number of miles traveled by individuals, it would increase the amount of people making trips altogether. The dense cities they speak of are cities such as Los Angeles and Miami. Although the population density is higher, there is a lot more development in these areas ranging from low to mid-rise densities. What causes traffic is not the amount of people living in an area, but the availability and closeness of amenities or areas of work. Sprawl may not densify the amount of people in a giving area, but it has definitely separated people from where they live and work. By looking at research done by the Research and innovative Technology Administration (RITA) and the Bureau of Transportation Statistics (BTS), we see that throughout the fifty states, we average about twenty-five minutes of commute time to work, with well over seventy percent of people who drive solo. In Hawaii, thirty-

[35]Sierra Club "*Sierra Club Declines to Make Mayoral Endorsement."* Hawaii Free Press. Accessed September 15, 2012. < http://www.hawaiifreepress.com/ArticlesMain/tabid/56/articleType/ArticleView/articleId/7252/Full-Text-Sierra-Club-Declines-to-Make-Mayoral-Endorsement.aspx >
[36] Gillham, *The Limitless City: A Primer on the Urban Sprawl Debate,* 77.
[37] Staley, *The Sprawling of America: In Defense of the Dynamic City* (Chicago: The Heartland Institute, 1999), 49.

five minutes is the average solo commute.[38] Commutes to and from work are the times when traffic are the worst because the number of drivers peak during those times. There is another issue with having main automobile arteries. This issue deals with traffic caused by accidents and road closures. On Oahu, a single major accident can form gridlock and strand drivers for hours. One example of this occurred recently on October 31, 2012. A garbage truck slammed through a freeway median, causing traffic from 1:30PM to about 9:00PM for vehicles traveling both directions People took an average of 2.5 – 3 hours to get home because of lane closures.[39] Regardless of the density of any given area, the distant separation of home, work, and other amenities forcing us to drive is the true cause traffic.

Other problems associated with sprawl deal with social life. The cost of living, separation of classes, open spaces, and health are among an ever-growing list which some say are a result of sprawl. These are the most troublesome after the issues of land-use and traffic.

The cost of living may not be so obvious at first. The amount of money we spend on gas because of the need to always drive to our destination adds up over time, let alone the expenses to buy the car in the first place. If I were to calculate my own expenses for driving to work, while maintain a stable job. It is roughly $50 every four days I drive to town. 52 weeks in a year x 5 days of work a week = 260 working days, let us say we subtract 20 days for holidays and days we take off of work. 240 days / 4 days before I need to put in gas = about 60 times ill need to fill up x $50 on average each time for a full tank of gas = $3000 a year. That is not counting all the other daily tasks that require me to drive. This is only the cost for one person driving in a household. This also does not include the costs to maintaining a vehicle and insurance. AAA released an article in April estimating how much we spend a year to own a vehicle. The average car costs approximately $9,000 to own a year. Things like insurance and gas cost vary widely among the many different cars to we can be spending anywhere from $6,000 - $12,000

[38] Research and Innovative Technology Administration (RITA) and the Bureau of Transportation Statistics (BTS). " Table 401: Commuting to Work: 2010." http://bts.gov.
[39] KHON2 News. "Man in serious condition after garbage truck crashes into H1 median." Accessed November 1, 2012. http://www.khon2.com/mostpopular/story/Man-in-serious-condition-after-garbage-truck/4EqqmrrK1kCZhVS-qtPQMw.cspx

State	Population	Time Commuting to Work
Alabama	1,951,769	24.1
Alaska	343,424	18.8
Arizona	2,621,839	24.5
Arkansas	1,225,968	21.2
California	15,921,475	26.9
Colorado	2,428,102	24.1
Connecticut	1,707,618	24.7
Delaware	404,044	24.3
District of Columbia	296,717	29.4
Florida	7,865,975	25.5
Georgia	4,118,024	27.0
Hawaii	657,295	25.5
Idaho	669,892	20.4
Illinois	5,792,659	27.9
Indiana	2,845,206	23.2
Iowa	1,513,705	19.1
Kansas	1,358,914	19.1
Kentucky	1,803,377	22.6
Louisiana	1,932,178	24.8
Maine	627,588	23.3
Maryland	2,847,946	31.8
Massachusetts	3,151,546	27.6
Michigan	4,044,769	23.9
Minnesota	2,649,994	22.9
Mississippi	1,158,617	23.8
Missouri	2,706,413	23.0
Montana	459,904	18.6
Nebraska	921,395	18.4
Nevada	1,184,067	23.3
New Hampshire	667,506	25.9
New Jersey	4,054,388	30.3
New Mexico	857,959	22.2
New York	8,723,526	31.3
North Carolina	4,119,560	23.4
North Dakota	359,823	16.1
Ohio	5,070,590	22.8
Oklahoma	1,653,574	20.8
Oregon	1,665,614	22.3
Pennsylvania	5,723,063	25.9
Rhode Island	479,988	22.9
South Carolina	1,948,160	23.5
South Dakota	403,672	16.8
Tennessee	2,676,457	24.0
Texas	11,145,480	24.6
Utah	1,210,020	21.2
Vermont	314,463	21.7
Virginia	3,845,626	27.5
Washington	3,046,571	25.1
West Virginia	727,598	25.6
Wisconsin	2,757,982	21.6
Wyoming	278,970	18.3
United States, total	136,941,010	25.3

Figure 11 Table showing all states population and the mean drive time to work for 2010. Data are for workers age 16 years and over. The State designation of workers is based on their residence. Information provided from RITA/ BTS. Source: Research and Innovative Technology Administration, Bureau of Transportation Statistics, U.S. Department of Commerce, U.S. Census Bureau, American Community Survey 2010.

on our cars a year.[40] Especially coupled with rising gas prices, these costs have been rising.

Other social aspects which sprawl harms are the separation of our class standings, inconvenient open space, and health. Andres Duany expresses his concerns in "Suburban Nation," in which he explains how subtle separations occur between sub-divisions, or pods of housing. Usually, houses within a certain area go on the market for roughly the same price. Duany explains how this leaves the rich living with the rich while the lower class lives in areas that slowly decline.[41] Furthermore, we may even see segregation between racial classes because these communities attract the like. In my opinion, the developers have a lot of weight on deciding who lives in the community just by setting a certain price range and the way in which the houses are designed.

Children suffer from a lack of open green space to play in because they are tied to the boundaries of their street. Unless parents are willing to take their kids to the local park every day, these kids are either forced into playing in the car filled streets or stay inside and watch TV or play video games. A research by the CDC shows us that about one-third of American adults are overweight and 17% or children ages 2-19 are also overweight.[42] Though available parks and open space exist, it may not be easily accessible by everyone without walking through a maze of housing to get there.

Another issue coupled with open space is gathering space designed to cater to teenage and elderly age groups. The teen age groups begin to make their own decisions on what leisure activities to engage on and also are beginning to drive independently. We would like to believe that most teens behave on their free time, but, as movies depict, there are situations of misbehaving teenagers in specific neighborhoods. Jane Jacobs and Clarence Perry talk a great deal about this, which we will touch upon in the coming chapters. I do not think it is particularly the area they live in which influences them, but it may deal with the distance to activities from their house or the lack of things to do, as well as being sort of confined to their neighborhood. As a popular saying goes, "idle time is evil time." A vibrant neighborhood may give us more things to occupy the younger generation with.

[40] Pritchett, Ginnie. "Cost of Owning and Operating Vehicle in U.S. Increased 1.9 Percent According to AAA's 2012 'Your Driving Costs ' Study." AAA Newsroom, http://newsroom.aaa.com/.
[41] Duany, *Suburban Nation*, 43.
[42] Ogden, Cynthia and Margaret Carroll, "Overweight and Obesity." Accessed August 20, 2012. http://www.cdc.gov/.

Chapter Four
Concepts to Counter-Act Urban Sprawl

Over the years there have been countless designers, urban planners, architects, and activists fighting for the increase in quality of life for our cities and neighborhoods. Here we look at a couple ideas, which have inspired this research as well as changed how we look at the design and planning of communities. These concepts are like the lights at the end of the tunnel in which we hope will make our lives more convenient through better design and planning. Jane Jacobs fight through revitalizing the city and making communities more of a social experience, the "New Urbanists," and Smart Growth agendas that look at pulling us out of our cars and back into the real world.

The overall responses for both Jacobs and Smart Growth run along similar paths to solve similar problems. In looking at what triggered their interests in solving these problems, we find different reasons for responding. In Jacobs's case, it was an activist's point of view as a member of the community who wanted the city to be fixed up instead of destroyed.

Taking a look at the Smart Growth agenda, we see it as a strong stance against what we described as sprawl. Although the guidelines are similar there is also less of a feeling against sprawl with New Urbanism compared to Smart Growth. The need to go over both their guidelines would not prove beneficial since they are so similar. In looking at both Jane Jacobs ideas and Smart Growth guidelines, we can draw inspiration for implementing these ideas in a number of low density areas.

BETTER PUBLIC SPACES

Jane Jacobs's book, *The Death and Life of Great American Cities,* gives us a detailed look at what makes city spaces lively and safe versus dead and unsafe. She translates the scale of a sidewalk into the city scale of the neighborhood. Her research comes from the perspective of someone witness to the cities faults and success in creating spaces for people. She breaks down the neighborhood into pieces from sidewalks, to parks, to the neighborhood itself.

Sidewalks are used to create experiences at the pedestrian level. Jacobs describes them as a way in creating public interaction, safety, and physical diversity. In many subdivisions today, sidewalks are often bordered by the same monotonous row of housing and a small strip of grass virtually unusable except for our pets to relieve themselves. They are also barely wide enough for two people to cross paths without having one step off to the side. In other places like strip malls or areas lined with businesses and shops that are busy during the day, become sleeping places for the homeless at night. Zoning often requires us to setback the building from the street making it difficult to create interaction between the shops and the street front.

Jacobs also mentions safety as an issue when developing solutions for sidewalks and streets. If they look or feel unsafe, people will not use them because they are uncomfortable; their idea of safety is compromised.[43] Creating more diversity and uses for the sidewalk will draw more people to use them, which will also lead to a larger network of eyes looking out for the unusual. We can all visualize those movies where there is a young girl walking down a deserted street and a stalker hides in the shadows waiting to grab her when she walks by. This is not too far from the truth, research by a small group at the Jill Dando Institute of Crime Science at the University of London have linked crime to the spatial make up of places rather than the criminal minds themselves. Not only do they show that streets with less access from main areas of travel have more crime, but it also shows that having too much people crowded can give rise to crime. The Notting Hill carnival in London attracts over a million people each year which fills the streets beyond capacity. It is easy for people to get pick-pocketed or even assaulted.[44] Going back to Jacobs view on street safety, we have to provide the right amount of interaction at the pedestrian level. Too much or too little people can also lead to unsafe environments. Having enough people that are from the community or become trusted can create a sense of safety.[45]

This same diversity and networking of people extend to the larger components of the park and the neighborhood itself. They cannot stand alone as a single entity. Many parks in sub-divisions are placed there with the thought in mind that people will use it if it is there. The park becomes only accessible to people who use it during the day or are willing to walk to it. Jacobs mentions that the same reasons a lively sidewalk is used

[43] Jacobs, *The Death and Life of Great American Cities,* 30.
[44] Bowers, Kate. "Sin Cities." New Scientist, Accessed September 1, 2012. http://www.newscientist.com.
[45] Jacobs, *The Death and Life of Great American Cities,* 37.

continuously, “is because of the functional physical diversity among adjacent uses, and hence diversity among its users and their schedules.”[46] This goes for all open public space, not just park space. People can have more reasons to use the park rather than for just leisurely activity. They can grab lunch between work hours and sit on a bench; it could be an elderly couple taking a walk mid-morning while also picking up some groceries, or a family passing through at night to get dinner nearby. This diversity Jacobs speaks of is a diversity of not only uses, but diversity in functionality throughout the day.

Jacobs gives us four guidelines for successful neighborhoods that begin to run into the ideas of smart growth design. First, a district should function with at least two purposes. Second, blocks should be shortened to break the monotonous strip of buildings. Doing so will produce a better pedestrian experience. Third, the district should promote a mix in new buildings as well as aged buildings. Fourth and last, there should be a dense concentration of people in the area for whatever purpose they may be there for.[47] These guidelines strongly reflect what smart growth principles promote. Jacobs mentions the costs for having all new buildings in an area, which make it difficult for a diverse set of people to live there. Having all new buildings makes it costly for that district to function as well as additional costs for new construction. There should be a mix of high, middle, low, and no yielding enterprises, which go from professional services to non-profit organizations. The overall feel of Jacobs’s research seems to point at diversity throughout all aspects of the city and its people to create a more lively community. Smart Growth takes us one step closer into achieving these ideas of diversity by breaking them up further and expanding upon ideas Jacobs had many years prior to *The Death and Life of Great American Cities*.

Jane Jacobs’s ideas were not directly pointed at sprawl type communities; rather, they directed towards communities that were dilapidating due to its own poorly planned spatiality. Smart growth directly targets urban sprawl as a factor for creating similar problems Jane Jacob has observed in her time. The main website for promoting Smart Growth, “Smart Growth Online,” gives use a quick run through of smart growth principles. Combined with research done by Andres Duany, Jeff Speck, and Mike

[46] Ibid 97.
[47] Ibid 150-151.

Lydon, “The Smart Growth Manual” begins to go deep into creating a diverse community for people to live in.

The first aspect to strive for is creating a range of housing opportunities and choices. This may solve many issues that sprawl fails to address. Focus should be placed on incoming families by providing housing opportunities that appeal to all incomes. Single families, multi families, and affordable housing are a few of many types that should be offered. By doing this, poorly-maintained affordable housing apartments are reduced. Rather than focusing on one housing type, diversity can be created among people through various income and age groups.[48] This can help prevent the creation of communities that are labeled “poor” which become rundown and crime infested due to low maintenance and safety measures. Having a diverse range of people also means a diverse schedule for using amenities that surround them. Foot traffic also occurs throughout the day by providing retail and nearby public amenities.[49]

The second criterion is to make the entire community walkable. Careful planning decisions must be made to discourage the automobile as a primary method of commute. An alternative to transportation such as biking and public transit should be provided. This promotes better social interaction on the street, reduced driving costs, and reduced crime rates – as Jacobs mentions, more eyes on the street means less crime because the neighborhoods aren’t left empty.[50] Along with walkability, the network that allows the community to become more accessible by foot need to consist of smaller blocks and highly planned hierarchy of roads or access.[51]

Stakeholder and community involvement is a large part to creating a successful smart growth development. By involving the people who know the problems and advantages of living in their community, planners can make better decisions that are more worthwhile. They can analyze what the community currently lacks whether it is diverse housing types or economic drivers. Though it may seem like a burden, following smart growth principals may result in a better live able community as a whole.[52]

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[48] Duany, *Smart Growth Manual*, 5.3.
[49] Smart Growth Online. “About Smart Growth.” Accessed November 2010. http://www.smartgrowth.org/Default.asp?res=1680.
[50] Smart Growth Online. “About Smart Growth.”
[51] Duany, *Smart Growth Manual*, 7.1
[52] Smart Growth Online. “About Smart Growth.”

The next criterion plays off the last- fostering distinctive, attractive communities with a strong sense of place. Again, developing a vision that relates to the community's long-term goals and applying their existing characteristics can make a community more distinct from others. This gives community members to be proud of where they live as well as love where they live.[53]

The mixing of uses and preservation of open space go hand in hand. A wide mix of uses should be provided so people can live, work, and play where they live. This eliminates problems of waiting in traffic and driving long distances to go to the mall. Simultaneously, open green space should be provided. They can greatly contribute to healthier lifestyles and provide areas for relaxation and recreation.[54]

Along with mixing of land-uses, compact building design should be applied. If surface parking and hardscape surfaces are eliminated, opportunities for more green open space can be provided.. This also goes back to the fact that people don't have to drive all over the place to supplement their daily needs.[55]

The last two criteria involve making fair, predictable, and cost effective decisions and directing growth towards existing communities. The first deals with gaining funding from the private sector. Without their funding, it will be very difficult begin a smart growth project. To encourage the private sector to follow smart growth principals, governments must first invest on infrastructure and regulations to keep the community aesthetically pleasing. The proper variances to zoning and building codes have to be acquired early and expedited so that the developers do not waste money on potential land. This all starts at selecting the right places to implement all these criteria. Some communities may be more difficult to to work on than others, so good decisions must be made on what communities to implement Smart Growth on first.[56] Incentives should be made on zoning and building codes that promote smart growth rather than existing zoning codes that make it hard.

It is really hard to convince people to believe in a new idea, especially when it has been hard to distinguish a set of rules of achieving smart growth. Some communities claim to

[53] Ibid.
[54] Ibid.
[55] Ibid.
[56] Smart Growth Online. "About Smart Growth."

be a smart growth community, but in reality they are not. They have blown hundreds of millions of dollars and become unreachable to the average household family. One of the problems related to smart growth is that it actually increases the price tag of homes.

One article in Planetizen by David Goldberg brings up an issue of high cost housing that becomes unattainable for lower income families. He then states, "we are the ones who pointed out that, in most metro areas today, it is no one's responsibility to ensure that low and moderate-income families can find a decent home within reasonable proximity to jobs and essential services. Meanwhile, virtually every jurisdiction has the right to abuse zoning provisions to exclude them, and too many do."[57]

The government must be reassured that affordable housing can be affordable, and that it will break the mold of lower-class living. Many people believe that affordable housing is poorly maintained, cramped together, and are located in areas that are known to be unsafe. Planners of smart growth must be very convincing in their argument to attain affordable housing for future development. The article by Goldberg continues to say, "What are the nay-sayers providing?" What does continuing sprawl development offer? It brings people farther from their places of work and recreation, its run by automobiles and traffic congestion, housing prices in that area are also shooting up, and it has higher crime rates. This is all a factor of separating all the uses, neighborhoods become empty during work hours, and commercial areas become resting grounds for the homeless overnight. If smart growth is the answer, more research needs to be done on policy solutions and to attain affordable housing. Some options already on the table as listed by the article are: density bonuses in exchange for an affordable component, regional fair-share housing plans, mixed-income projects that help redirect infrastructure costs for lower priced units, travel options that reduce embodied automobile costs, rehabilitation codes to make it less costly to use older buildings, re-use of vacant properties, myriad tax-incentives, efficient mortgages by locations. Any of these solutions, and others if discovered, should be applied to gain as much funding and support for an affordable component.

One idea instilled in smart growth is re-densification. The writer talks about Portland's problems of densification in its recent years. The problems rest in Portland's anti-

[57] Goldberg, David. "Housing Affordability: Is Smart Growth the Problem, or Solution?" Planetizen. Accessed November 2010. < http://www.planetizen.com/node/62 >

highway policies. Their transit lines have suffered a twenty percent drop in usage after the 2000 Census. Their highway congestion has increased. Both Dallas and Seattle have had higher percentages in alternate means of travel compared to driving alone. The problems rest in the housing affordability rates dropping in the area. It seems Portland hit a wall in the amount of people moving into the area. As the population densification decreased in the area, the cost of living increased.[58] They compare the number to places that experienced high amounts of growth where housing affordability increased. It also seems that Portland reached its densification limit with how much capacity its metro line can handle. It would make sense that as the development became more crowded, the metro was no longer convenient and comfortable. Large amounts of people crowding into the trains may not be much an enjoyable feature, lowering the amount of new people moving into Portland. It is also a stern regulation that the metro line have placed to enforce densification. This goes back to the early schematic planning stages. Population increase should be extrapolated to the extreme. There must be the capacity to sustain the best and greatest new type of lifestyle. The projected amount of people using public transit and other alternatives cannot be overlooked, so there are no more downfalls like this one.

The last issue hindering the use of smart growth is bad implementation and use of the term with a corrupt end goal. Through a few comments on the past two articles, people have voiced a concern that use of the term "smart growth" is sometimes misused. Governments use the idea to change zoning types in an area that already has under-utilized high density areas.[59] This confuses people on how to distinguish the difference between smart growth and urban sprawl. Abusers of the term should not continue to develop these types of communities. So-called "leaders" in the community also misuses the term. One response showcases an example in Austin, Texas. The conservative business leaders and government have abused the principals to create a large industrial park within the area. The writer continues to say that housing prices have gone increased in that area to the point where families are again moving out to the suburbs where a place that is more affordable to live in. It is another example of not only abuse, but not following all of the principles listed earlier. If one proponent of its ideas is

[58] Cox, Wendell. "Trouble in Smart Growth's Nirvana" Planetizen. Accessed November 17 2010. < http://www.planetizen.com/node/57 >
[59] "*Housing Affordability: Is Smart Growth the Prblem, or the Solution?"* Accessed November17 2010. Planetizen comment from < http://www.planetizen.com/node/62 >

left out, the whole system may not work, in turn becoming degrading as a sprawled suburbia.

No matter what problems are produced from smart growth, I am a strong believer in what it has to offer. Advocates must continue to push, and follow the rules that have been laid out by Duany. A closer look must be taken on types of development called smart growth so that fake developments cannot continue to destroy what smart growth tries to pursue. The guidelines cannot be implemented halfheartedly.

Both these points of view are of enormous help to this research in breaking down each aspect of creating a healthy community as well as how to achieve this goal. The difficult part in transferring this information into a physical form is determining what that form is or will be for an existing community. The next chapter will help us outline the tasks we must achieve to create good growth with a mix of uses and better pedestrian experiences. Then we will begin to focus our ideas into first beginning change in existing single-family home clusters of development. The reason for doing so is to attack what is felt to be the main problem to sprawl- the disconnection between homes and activities of everyday life. This includes work, play, eat, shop, and public places for social interaction. By integrating what smart growth defines as mixed uses along with the safety and public interaction enforced by Jane Jacobs, we can make this living typology much more uplifting for human life.

PART 2
A NEW TYPE OF NEIGHBORHOOD

CHAPTER FIVE
Striving for a Better Neighborhood

If urban sprawl continues to spread throughout the United States, the demand for more land may be so consumed and tap into precious agricultural and environmental land. The separation of where we live, work, and play through a network or roads are creating problems that can only get worse. Rapid growth, poorly planned communities, and a desire for quick financing are factors that contribute to urban sprawl. Americans desire to live in the suburbs where they can get away from the hustle and bustle of the city. Having done research on numerous development ideas against sprawl, this chapter focuses on pulling from these ideas, the important guidelines and criteria.

As observed, this desire to move out of the city has progressed more and more over time. The abundance of land during the industrial period, the introduction of the automobile, and the populations that had an increase in income made it possible for families to migrate into the suburbs. Today a pattern has been developed in which housing communities are developed followed by smaller businesses.

Urban sprawl cannot continue to dominate the way in which cities and communities are developed. Open land will become sparse, people will continue to live further from work, and traffic will continue to increase. According to projections made by the Census Bureau, the population of the United States will double from its 1990 population to over 392 million.[60] That means more people need new places to live, more driving, all on less land to do so. A much more thought out plan must be implemented and executed to enhance existing areas of development and a better quality of life. This is the aim towards creating a better neighborhood.

Many theories have been made and tested in an attempt to counter urban sprawl. From the detailed criticism of Jane Jacobs on how more enjoyable and intimate communities can be created to the guidelines of New Urbanism and Smart Growth, better solutions are still being developed. Not only should focus be placed on planning and architecture

[60] U.S. Census Bureau. http://www.census.gov/.

of the buildings, cities, and neighborhoods, but also the needs of people should be considered through the process of design.

The first objective in creating a better neighborhood is to analyze what people want versus what they need in a city or neighborhood. This in turn can create a place that everyone will enjoy, in a sense where city and suburb is blended together; much like Ebenezer Howard's description of the town and country magnet. Although in this case, town being our city centers and main concentration of business, and country is our place of living.

The initial description of creating a better neighborhood is based on research from other bodies of information that have been analytical on solving the many issues of sprawl. These guidelines also relate to the scale of the region which goes beyond the size of the city and the neighborhood, but is important in terms of a neighborhood contributing to the larger whole of the picture. The main points are pulled from previous research we discussed in the earlier chapters and they are to:

- Define a region and locate the city centers and areas lacking in diversity.
- Establish a connection of spaces through alternative modes of transport and pedestrian travel.
- Neighborhoods and districts should be mixed use.
- While being mixed use, housing types should appeal to all types of income levels and lifestyles. Lifestyles which refer to single families, couples, or singles.
- Increase density of suburbs, at the same time mix amenities into suburbs rather than surrounding it.
- Solve issues of traffic through planned networks of alternate methods for transport.
- Densification leads to skepticism of increased traffic. If pedestrian travel, jobs, and amenities are all provided, the need for cars is reduced.
- Careful design of street front, buildings should engage the sidewalk, and produce social interactions.
- Constant public/ stakeholder interaction to create public interests and support. The public should also be encouraged to participate in the development of their own "New Cities."

- Buildings must be sustainable to decrease the lifetime costs of heating space and utilities. They must also take into consideration the valuable environmental and open spaces around it.

In suburban areas, densification may be associated with creating mid to high-rise development, which may lead to skepticism. Somehow, densification within these areas must be done in a way that incorporates many of the traits in suburban neighborhoods that the American family is drawn to. This not only means a mix of housing types but also a mix of green space or private "yard" space at many different levels.

While looking at a city or neighborhood as compared to its entire region, making connections may be difficult. For a particular city or neighborhood the comfortable travel distance for various alternatives may they be, walking, biking, catching the bus, or the car, the distance and placement of amenities should be such that it is convenient for each alternative.

Urban sprawl has continued and developed over a long period of time, to the point where people became adjusted and content in the way their lifestyle. It has become the norm for most to desire a single family home and an automobile. Sprawl was not originally sprawl, but had responded to problems and needs that have developed over time. Now we face a new era of problems and needs that will not be all solved immediately in the U.S. but will involve a long process geared towards changing the mentality of Americans.

The ideas listed above involve an analysis from the micro to macro scale involving as much integration as possible. Families have been continually looking for different places to live depending on the time period. Neighborhoods continue to expand today. Some studies show that the amount of housing developed compared to population increase does not match up. Development is occurring at a faster rate than population increase. Beyond focusing on housing as a main issue, the idea of "sprawl" will be analyzed in Kapolei, a growing "second" city in Hawaii. The need for space and land use on Oahu is much more alarming than that of the continental U.S. because of its island land mass.

CHAPTER SIX
Neighborhoods, Housing and Hawaii

So far, various solutions have been proposed that can potentially mitigate the issues that sprawl brings forth. In this chapter, focus will be placed on Hawaii, the island of Oahu in particular. As described in previous chapters, Oahu has seen similar developments spread from the city center of Honolulu for various intentions. But before this can be discussed, we must first have a general understanding of neighborhood housing in Hawaii. What makes a neighborhood and what housing types are offered?

Throughout the research, Oahu's history of development has been referenced in comparison to what has gone on in other parts or the world. Oahu's evidence of sprawl is clear in terms of the observed disconnection of housing and job centers, traffic, and the reliance of the automobile. With sprawl being such a wide-spread topic, the thinking now is that one particular aspect of sprawl should be fixed. Housing and the collection of housing, neighborhoods were chosen as an aspect to fix. We saw the boost of housing need after the war, the FHA making it easier to get housing, and now the expanse of low-density housing. Housing was chosen because of the intimate ties it has to people. Most people have chosen where they want to live for centuries. Home gives us both comfort and privacy, home meaning our house. Overtime, the context of our house has changed into the monotonous "stamped" housing that is disconnected from its surrounding uses.

One of the issues of housing on Oahu is the high cost of living. The limited land footprint of an island's land mass contributes to the immediate high costs of land and building construction. Political drivers cause another factor that contributes to cost. Thomas Sowell describes laws that restrict certain land uses drive up these costs.[61]

Besides cost, the design of these houses, their clusters, and context have a way in dictating how people live outside and around these areas. A short article from *Honolulu Weekly* by Robert Harris describes Hawaii as being stuck in a pattern of creating suburban sprawl. He also notes that poor planning leads to massive carbon dioxide

[61] Sowell, Thomas. The housing boom and bust. Basic Books: New York, 2009. page 14

emissions, and wasting billions of dollars.[62] The cost of energy is even higher since fuels have to be imported. Harris continues to discuss the disconnection of the urban cores and suburbs. Focusing housing towards urban cores will take advantage of existing infrastructure, create more jobs, and with extra planning and design, can save homeowners money. This is by way of sustainable design and reducing the need of the private automobile.

The issue is also affecting the local political elections as illustrated in an article from the Sierra Club on endorsing a candidate in Hawaii's mayoral election. Two main discussions in the article are "keeping the country, country" and "developing a modern mass transit system." The first relates to reducing the spread of new developments into prime agricultural farmland such as Koa Ride and Hoopili. The second relates to focusing new development towards urban cores that are tied together by mass transit.[63] I agree with both, although I am not completely sold on the idea of mass-transit. Before creating a mass-transit system, which will hopefully reduce traffic congestion, we need to fix the disconnection between the suburbs and Hawaii's urban cores.

When tying these issues back together, the daily costs of living can be reduced, as well as taking advantage of pre-existing developed land. Now that there is a greater understanding of issues in housing, we can find search for answers of what can give us comfort of living in a neighborhood. While imagining what an ideal neighborhood is, we envision a place where everyone knows each other, people are always walking around, and there is an abundant amount green space for recreation. Clarence Perry's research gives more insight as to how we can achieve this ideal neighborhood. This will help us find a design solution later in conjunction with the issues of housing at the macro and micro scales in Hawaii.

Clarence Perry introduces us to the issues he is concerned with through the use of a story. He introduces the hypothetical Scroggins family who struggle with the context of their suburban single-family home. In this story a number of things happen. The adjacent plots become a storage yard for construction material and equipment, an apartment building is erected across the street, and there is no open green space. A few concerns conjure as well- distances to amenities are too far to walk to, the

[62] Harris, Robert. "*Rebuild City's Core, Stop Sprawl."* Honolulu Weekly. Accessed September 5, 2012. < honoluluweekly.com/feature/2012/06/rebuild-city's-core-stop-sprawl/ >
[63] Sierra Club "*Sierra Club Declines to Make Mayoral Endorsement."*

appearance of development surrounding their house, and the disconnection of human interaction.[64] Perry goes on to describe six principles that guide neighborhood creation. They are:

1. Size
2. Boundaries
3. Open spaces
4. Institution Sites
5. Local Shops
6. Internal Street Systems

Size is an important factor because it not only relates to the capacity of the neighborhood; it also implies the distances a person will have to walk. The difficult aspect of dealing with these criteria is that Perry's numbers only relate to a few instances that existing developments can fit. Perry gives us a ¼ mile as the maximum distance a person would travel by foot.[65] Roughly, this would be a 160-acre square development with a ¼ mile radius circle inscribed within it. With size determined, the boundaries of the neighborhood come into question. Perry describes this boundary as one that consists of the main automotive arteries. He believes that by doing this, it give the automobile little reason to penetrate or pass-through the site.

The next criteria are open space. Although Perry has done extensive research and has laid out numerous calculations in his book, there seems to be two main points he accomplishes. The first is play space nearby homes that are large enough for the children of the community. The second is open space that is large enough for activities such as football, baseball, and soccer. With both of these types of open space, we have to keep in mind distances and size.

The next two are institutional buildings and local shops. Institutional buildings include schools, recreation centers, and churches. These things can be balanced depending on community need and support. Perry also says that these things should be centered within the neighborhood so they fit into the ¼ mile walking distance criteria.[66] Local

[64] Perry, Clarence. Housing for the Machine Age. Russell Sage Foundation: New York, 1939. page 16-17
[65] Ibid 53
[66] Ibid 64

shops should be located on the outskirts of the neighborhood at main traffic junctions to preserve the quality of residential life.[67]

Connecting all of these criteria thus far is the internal street system. By creating this system, it should take into account the width of streets that would only be for the residents within the neighborhood. Also keep in mind that the main centers of activity by the residents to be easily accessed from anywhere within the site.

Clarence Perry's ideas on neighborhood make-up are important in delivering a design that will accommodate everyday life in the neighborhood. These criteria, along with the ideas from Jane Jacobs and Smart Growth, a neighborhood quality development that over all can make life safer and more convenient can be created. Perry's ideas give us numerical value to a lot of the other ideas we discussed in earlier chapters. This gives us the tools in which to create a development within an existing context. In Oahu's context, there is opportunity to bring growth to major urban centers where many amenities presently exist. Urban sprawl communities beginning to lose sight of the true definition of "community." A number of people speak about how everyone knew each other in their neighborhood. Children would be able to walk to local shops safely. The items would be taken down in a book and the parents would pay later. The way these people described their neighborhood community seemed much more close-knit than what exists now. The car reduces interaction, the roads and homes cut off the pedestrian access through out the site, and childhood development suffers from a lack of safe areas for play.

HOUSING STUDIES

To prevent this research paper from becoming biased, a number of studies were done on different housing types. The importance of doing a housing study is to understand the pros and cons of each housing typology. Housing typologies chosen for this study are built single family, multifamily, row house, and apartments found around the United States.

The first housing typology introduced is the typical single-family housing neighborhood found in Kapolei, Hawaii. This housing type is both easy and difficult to study, reason being there are so many iterations and sizes for the single-family home. A typical floor

[67] Ibid 71

plan of a house in Kapolei illustrates the basic needs for this housing type. Looking at Figure 12, the basic spaces needed in a single-family home is a garage, living room, dining room, kitchen, master bedroom, master bathroom, one or more bedrooms, and additional bathrooms. The difference between each housing variation is the number of bedrooms that also determine the number of bathrooms. The home can expand both horizontally and vertically depending on the regulations in the area. Private backyard space and a front lawn space are also standard to each single-family house package.

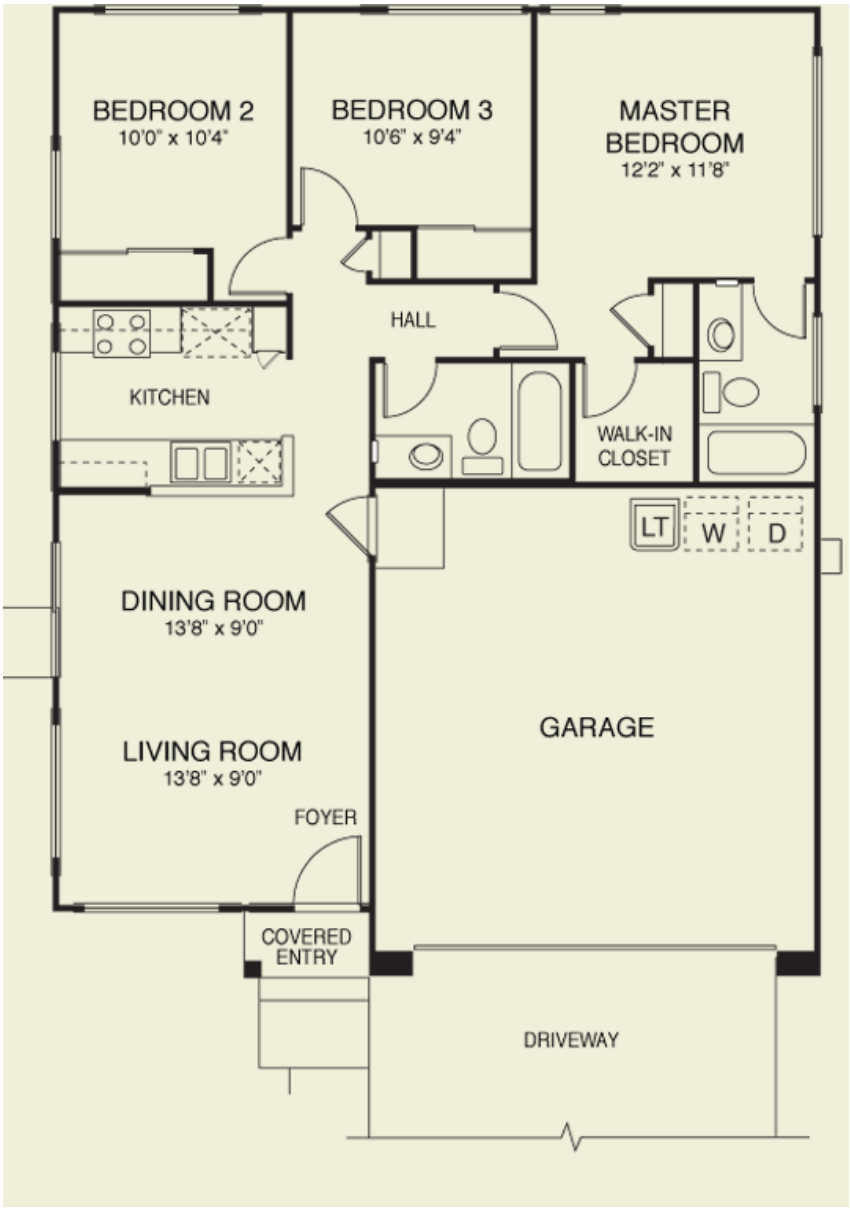


Figure 12 Floor plan of a one-story single-family home in Kapolei Knolls development in Kapolei, Hawaii.

The multi-family home is the next housing type up for study. A project that I was able to work on during my internship experience in Collaborative Studio in Honolulu, Hawaii, was for the Department of Hawaiian Homelands. The purpose of this multi-generational housing project was to design an affordable housing prototype that can support approximately fifteen people within three to four generations of families.

Multi-generational housing, as defined by the U.S. Census Bureau, is any household that consists of more than two generations of a single family under one household.[68] Though these homes will cost more due to their larger sizes, the goal is to financially sustain more than one family. They save money on shared utilities like the bathrooms and kitchens. Essentially, it is carries similar components of an over-sized single family home. The main difference is larger square footages for each spatial component. Many common areas are shared, such as the bathrooms and sleeping areas. Also, certain areas of private and public space are blended for space efficiency. Unless money is not an option, bedrooms would be shared depending on the family dynamics.

In Figure 13, we see one of the design iterations that are designed for the family size mentioned above. The design featured an oversized living room and kitchen, separate bathrooms for men and women, a few private rooms, and a shared sleeping area. A typical single family home is rearranged with oversized spaces. In this particular design, construction costs and material costs were main drivers, which led to the sharing of common spaces. Many families in Hawaii have adopted this type of living by simply expanding off of a single family home through multiple additions and renovations.

[68] "Multigenerational Household Information". Last Modified 2012. Accessed September 5, 2012 < http://www2.gu.org/OURWORK/Multigenerational/MultigenerationalHouseholdInformation.aspx#Multigenerational Household Key Facts >

Figure 13 Floor plan of a multi-family home designed for DHHL.

The next housing typology is the row house, which is notably found in the city cores of San Francisco and New York City. The row house is an interesting housing type, because there are multiple configurations for them. Three types of homes were studied in this category. Two types were the front garden house and the shop house. The three case studies were chosen based on the simplicity of the spaces for analysis. As we will see in the following photographs, the row house maximizes land efficiency compared to the single-family home. Housing units extend vertically and opposite ends of the building envelope share a structural wall with its adjacent. A number of these units line up in a

row where only the front and back are left for private space. In most cases, with the exception of the front garden example, the front of the home was open to the public sidewalk in front of the street.

The front garden homes of the 17th Arrondissement in Paris offer a good example of this housing type.[69] It features a gated green space in front of the home before arriving at the entry. Once inside, the home can extend upwards to about three or four stories depending on the amount of rooms. The basic spaces are still provided in a single-family arrangement, but it extends by adding on more floors in a smaller footprint. Like other typical row house designs, it is a mid-density housing typology, which allows for more units compared to the single-family home.

Figure 14 A pedestrian pathway between front garden homes in Paris.

[69] Firley, Eric and Caroline Stahl. The Urban Housing Handbook. John Wiley and Sons Ltd.:England, 2009. Page 104

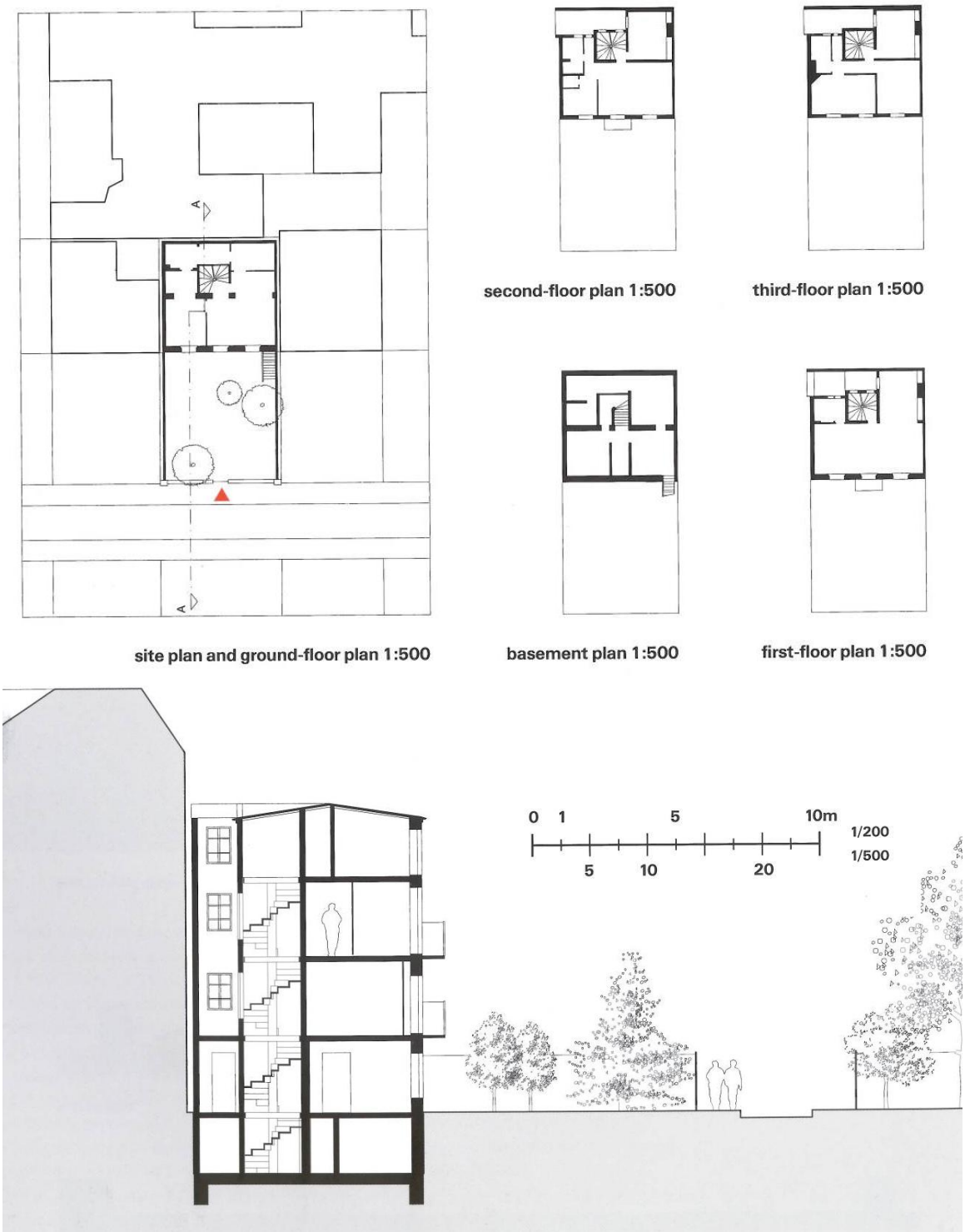


Figure 15 Floor plans and section for a typical front garden home in Cite' Des Fluers, Paris. The plan features a central staircase and windows on each floor.

The second derivation of the row house is the shop house. The typical shop house typology in Singapore was briefly studied. Unlike the front garden home, this building is a much slender lot within a block. A typical shop house functions dynamically, with a shop on the street level and house on the upper levels. Depending on the owners the shop could consist of the first floor in its entirety or partially, while the owners of that shop can live in its upper levels. In a neighborhood context, this provides both social interaction among small businesses and housing opportunities.

Figure 1 A shop house located in Singapore. The shop's street front is open to a public street, while the back of the house has a private street with a garden or private gathering space.

The row house proves to be very space efficient even though it is constrained to a narrow lot size. It has the ability to fit different needs of the residents and overall provides a higher density.

The last housing type is the apartment. To fit the objectives of the comparative study, I chose a mid-rise level apartment. The Yerba Buena Loft apartment in San Francisco, California features a simple modulated structure that consists of two loft types. A main access corridor through the middle of the building divides two sides of the building that face the street. Parking is also hidden in the central area of the building.[70] Depending on the developer, the overall building may consist of no just apartments but includes offices, shops, and public spaces.

[70] Ibid 262

In the Yerba Buena Lofts, the apartments extend from the first floor on the secondary street side of the building. On the main street, Folsom, there are a few retail businesses that surround the entryway. The unit types emulate the feeling of a detached house. It separates public and private space by use of the loft space. The spaces are also of comparable sizes to a single-family home, ranging from 640 – 1400 square feet.[71]

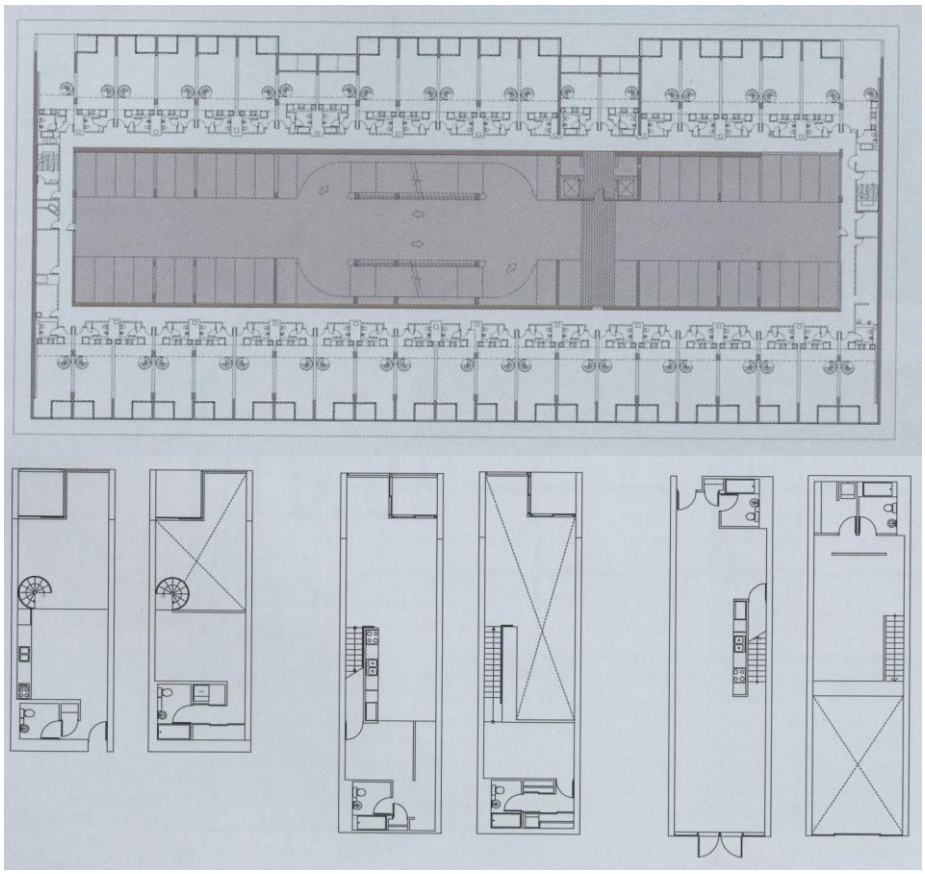


Figure 17 Floor plans of the building and individual loft units in Yerba Buena. Every unit features a loft ranging from a total unit size of 640 – 1400 square feet.

By using these studies, the density of a new development can be pre-determined. An estimate of the amount of units that can fit on a particular site using similar unit sizes and arrangement can be made. Densities can also be compared to determine how each housing typology will tie into an existing development as well as affect the way people move around a site.

[71] Yerba Buena Lofts Website. 2004 Accessed October 12, 2012 <http://www.yerbabuenalofts.com/info.html>

PART 3
A Comparative Study of Housing Morphology for Oahu

Site and/or Context Documentation/Analysis:
Studies on Kapolei, Mililani, and Aiea

Part 3, the final section of this research paper, runs through the process of a comparative study of housing typologies mentioned previously on a site located on Oahu. The purpose of the comparative study is not to create a new prototype in which the issues of sprawl are solved, but takes a different approach towards finding a solution to potentially counteract sprawl within existing developments in Hawaii. The earlier research has shown us that not only is sprawl an extremely diverse topic but also comes in many forms. This study is focused on various neighborhood typologies in the U.S. Due to urban sprawl's diverse character, studying a single housing type in a neighborhood context will not suffice. This leads to the belief that a number of housing types related to sprawl in different areas of the U.S. should be compared for their issues related to sprawl as well as the possibilities for improving them. Of all the issues discussed in this research, the main focus will be placed on density, walkability, distance of travel, alternate transportation methods, available open space, loss of community, and traffic. After a specific site on Oahu is chosen, the surrounding context and the problems involved will be explained. Each housing type will be laid out one site in its basic form. We will then analyze the effects of meshing four housing typologies. This will give us an understanding of the effects of sprawl by placing a part of an existing development in a controlled site. Various adjustments taken from the many ideas against sprawl and ideas for making better communities will be implemented in each condition to mitigate or even eliminate the issues listed above. Throughout the process, differences and similarities will be identified in both the untouched and modified housing conditions within a singular context.

We have also talked about how urban sprawl has affected Oahu's development. The issues raised previously are what specific areas in Oahu are struggling to control.

Earlier, we stated that Hawaii's population has increased to over double what was predicted in the 1950's. This is not due to the large spurt within the population of the islands themselves, but is subject to a vast amount of immigrants and other people planning on moving to Hawaii to take advantage of the tropical lifestyle. Therefore, there is an issue of rapid development that has been spreading throughout the state. This leads to the depletion and the invasion of urban land into agricultural land, which brings us to the conclusion that we must visualize housing interventions that promote more walkability, re-densify existing and thriving cities, and creating a more efficient lifestyle convenient?

The comparative study analyzes the effects of how four different housing typologies will influence and be influenced by the surrounding development in both positive and negative ways. In the initial phase of this research paper, three districts on Oahu were chosen to identify one possible neighborhood to study further. The three sites are Kapolei, Mililani, and Aiea. They are of varying distances from Honolulu, Hawaii's dense city core and state capitol. Each district represents various housing typologies, age, and potential for future growth. These districts are graphically represented in a number of diagrams, depicting district boundaries, major/minor roads and land uses. Miscellaneous spaces shown in the diagrams pertain to undeveloped land that may have future development planned for it.

Once a district is chosen for further study, four housing typologies will be meshed and modified into an undeveloped site within that district. Through a set of analyses and adjustments, the process hopefully will produce methods directed by Jane Jacobs and smart growth ideologies to fulfill the objectives of pedestrian experience, usable open space, and easy access to institutional and local shops.

AIEA

Aiea is located in a valley type setting with topographical qualities throughout the district. The district contains many single-family homes from the east end, and connects to the ocean on the west end. The shopping center and other commercial businesses are located to the south of the H-1 freeway. Since the freeway is a major element that cuts through the district, it creates limited access roads to commute in and out of the district. The location within a valley-like setting creates difficulty for the district to expand beyond the mountains that border it, so the only expansion opportunities in Aiea are to extend vertically. Aiea has a population density of about 8.78 people per acre with a total population of 9,338 people in 2010.[72] According to the census data of 2010, Aiea's population is primarily composed of the age group of people 65+ years of age. Relative to its size and population, the amenities provided in the district may not be sufficient, and the layout suggests that many residents have to travel by car to access them.

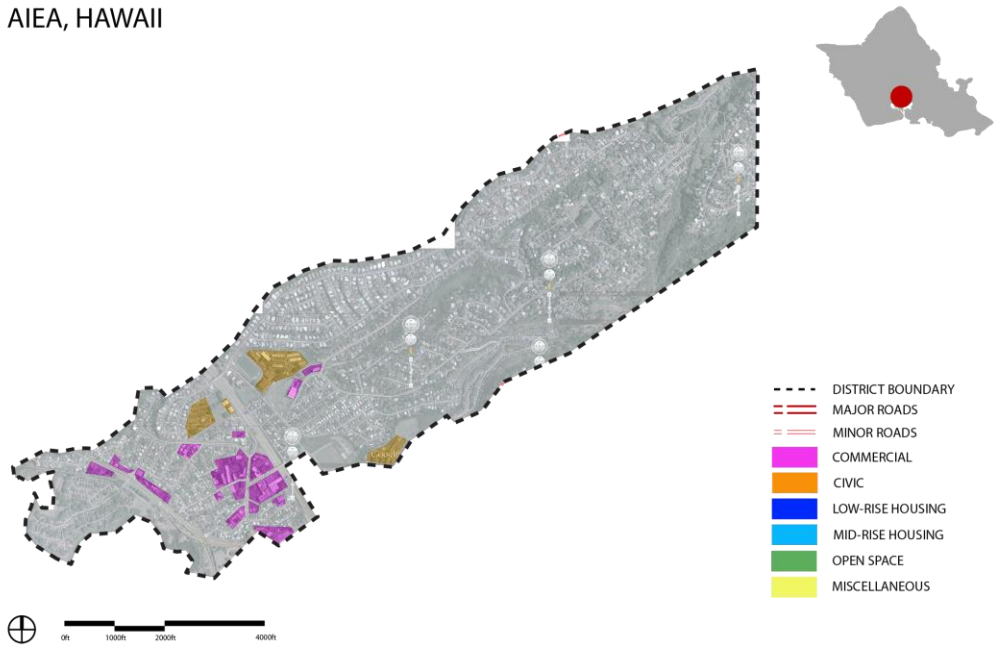


Figure 18 Aiea map of commercial and civic space.

[72] U.S. Census Bureau.

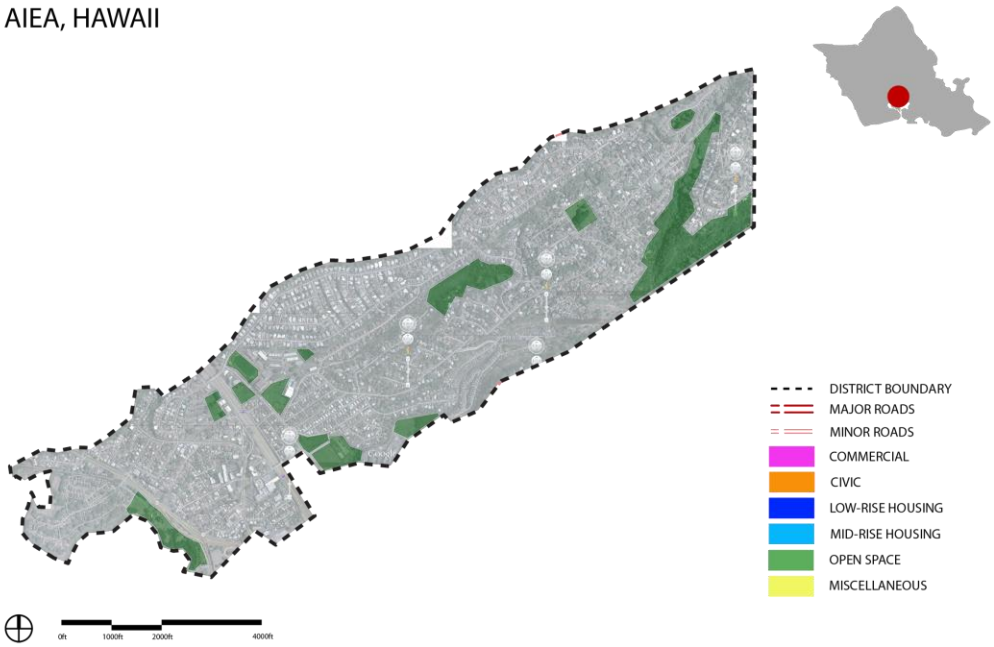
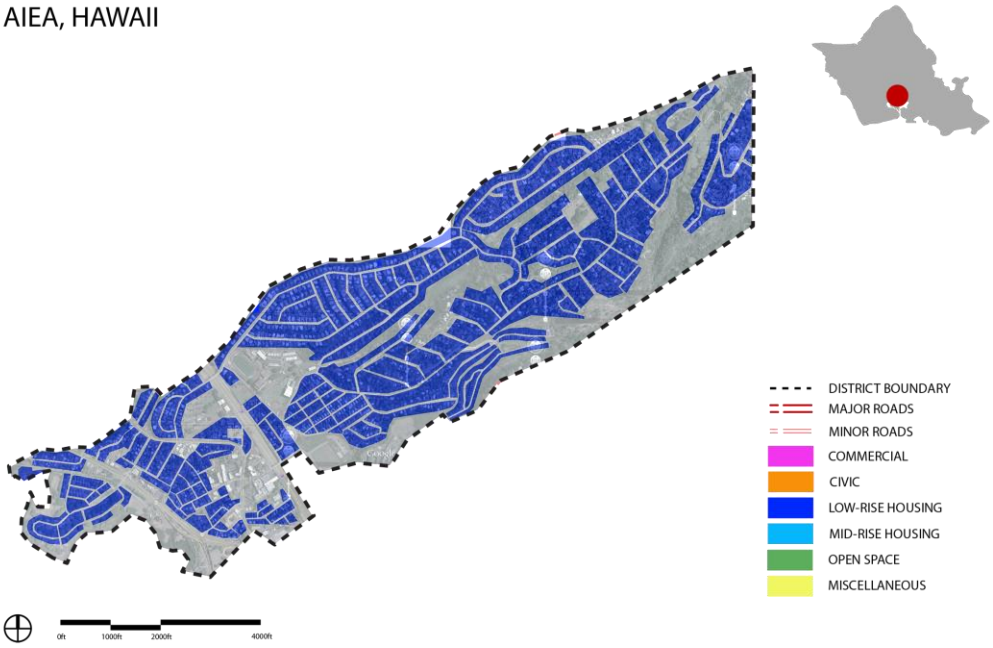


Figure 19 Aiea map of green and open



space.

Figure 20 Aiea map of housing.

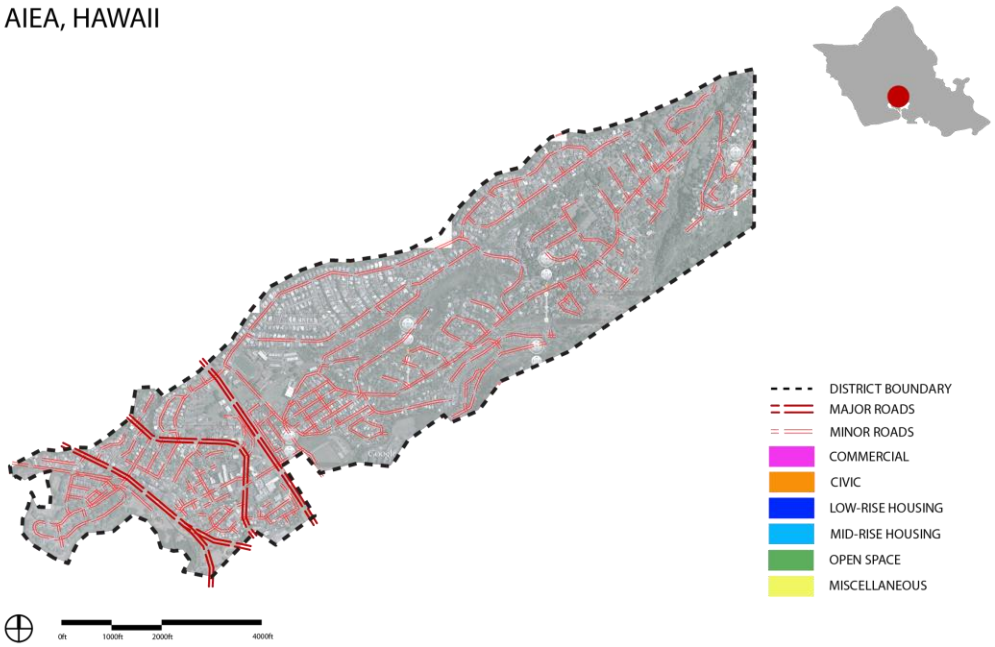


Figure 21 Aiea map of major and minor roads.

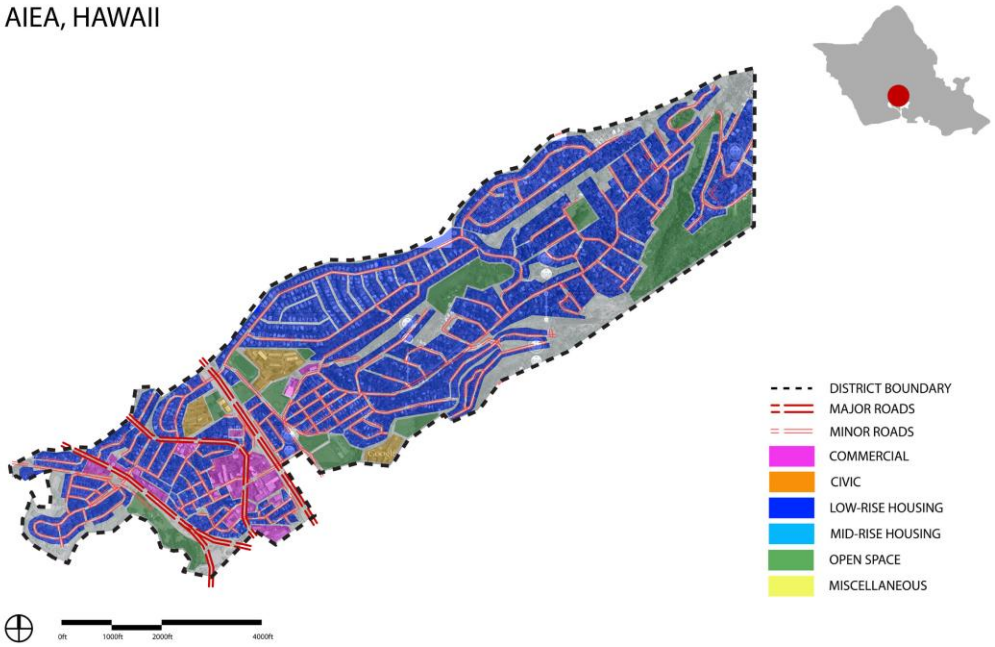


Figure 22 Aiea map of all uses.

MILILANI

Compared to Aiea, Mililani is a relatively younger district. It has experienced developments and renovations of shopping centers and other commercial activity. To be more specific, Mililani is cut into two districts by the H-2 freeway, Mililani Town and Mililani Mauka. The district we will be looking at for this study is Mililani Town. Mililani Town district has a population of about 27,629 people, with a population density of about 10.78 people per acre. In land comparison, Mililani Town is about 4.01 square miles compared to Aiea's 1.66 square mile size.[73] It does have a slightly off-center shopping area, but due of the district size and road layout, people are still forced to drive. There also seems to be a good amount of park spaces located throughout the district within walking distance for most of the residents. The housing types consist of mostly single-family detached homes and a few dispersed mid-rise level apartments and townhouses.

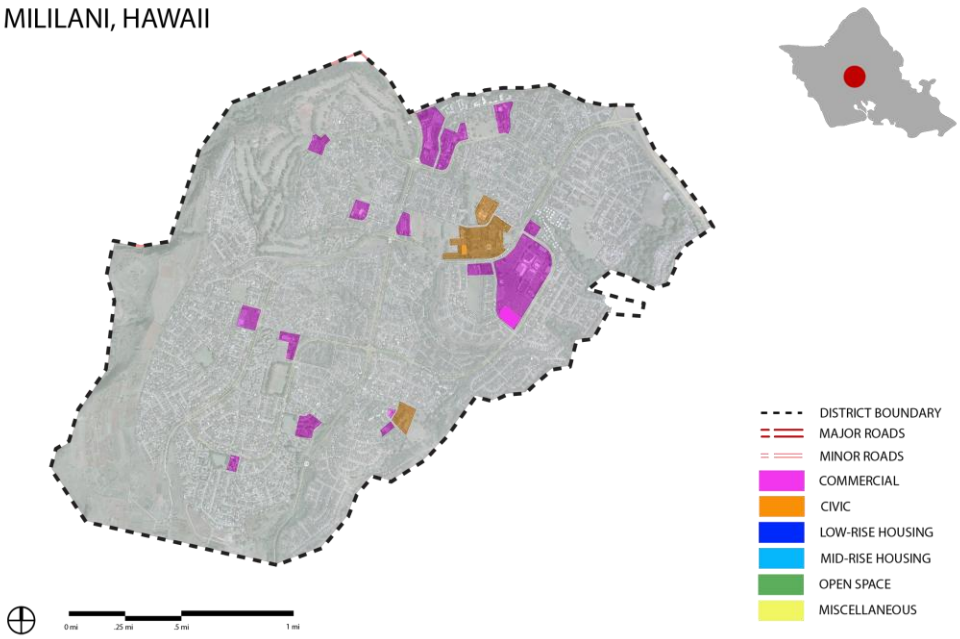


Figure 23 Mililani map of commercial and civic space.

[73] U.S. Census Bureau

Figure 24 Mililani map of green and open space.

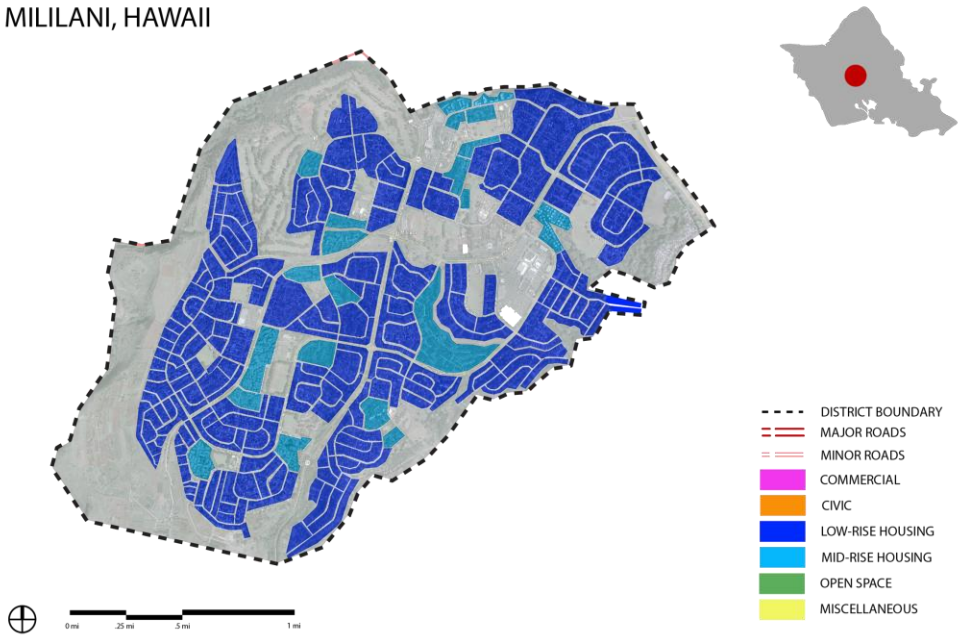


Figure 25 Mililani map of housing.

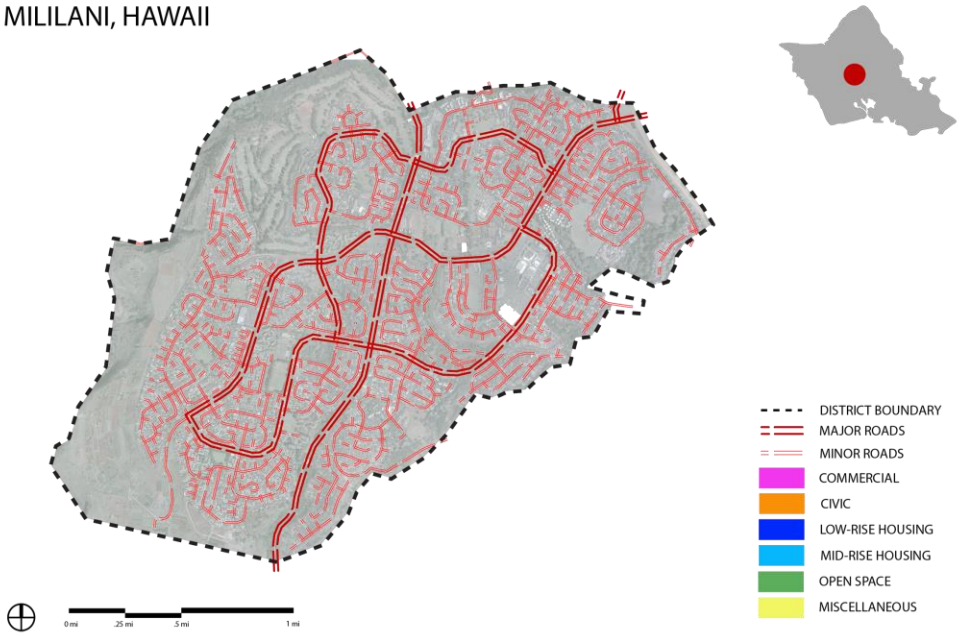


Figure 26 Mililani map of major and minor roads.

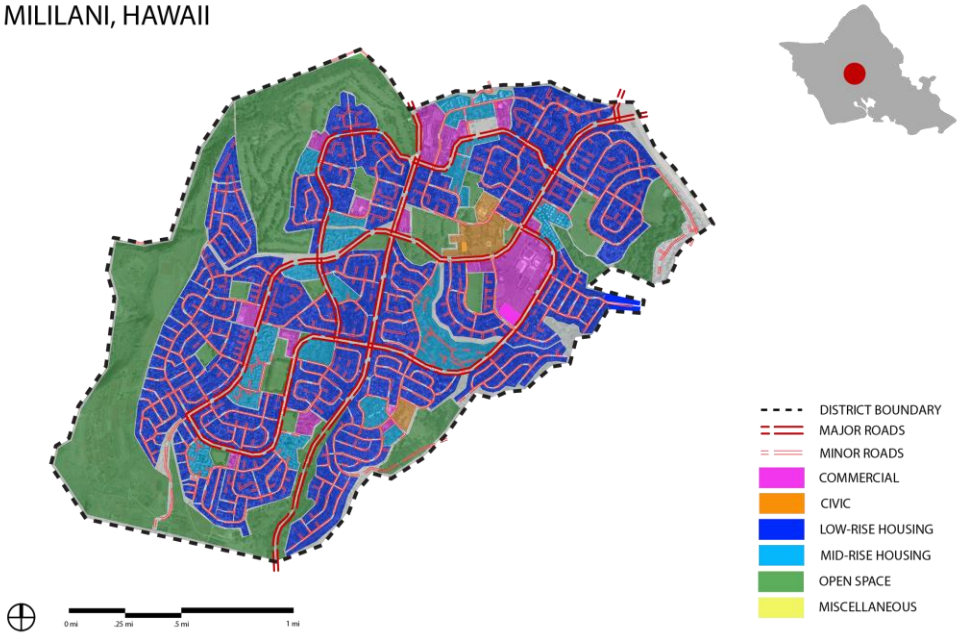


Figure 27 Mililani map of all uses.

KAPOLEI

Kapolei is the last development in this study and is the youngest of the three. Many call Kapolei the “second city” of Oahu because of its present and quick continuing growth in new housing and commercial developments. Currently, the housing developments consist of primarily single-family detached housing development, with a few dispersed townhouse buildings. Within the last 22 years since Kapolei broke ground, Kapolei has experienced major development of both housing and commercial space.[74] Within the last 5 years, commercial retail stores opened in Kapolei with additions like Target, Sports Authority, and Wal-Mart. Kapolei High School is about 8 years old and Kapolei Middle School is about 11 years old. Even with all of this development, Kapolei still offers a good amount of space for development. At a comparable size to Mililani Town at 4.14 square miles, its boundaries have plans to spread to major development filling the gaps to the east. Kapolei has plans to build a shopping mall rivaling the size of Ala Moana, housing developments, and to continue construction of the recently opened University of Hawaii West Oahu Campus. Many government businesses are also calling Kapolei home with sites like the Department of Hawaiian Homelands building and the Judiciary Branch.

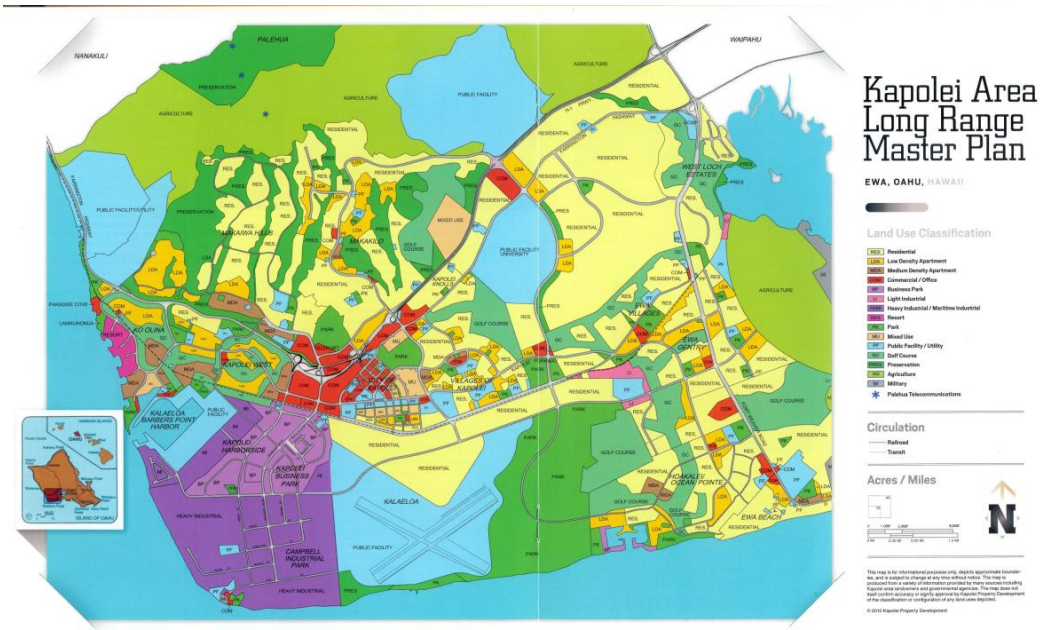


Figure 28 Kapolei area long range Master Plan.

[74]Kapolei Property Development LLC. “Committed to Kapolei.” 2012 Accessed October 20, 2012 < http://www.kapolei.com/about_us.cfm>

Kapolei is continuing its growth and with many opportunities ahead, there are also many opportunities to fix major issues that we relate to sprawl. Kapolei lacks accessible open space, amenities within walking distance, reduced traffic congestion, and density. Though larger than Mililani Town, the population density of Kapolei is only 5.73 people per acre. This can be due to the fact that when comparing the amount of housing shown in the diagrams to the other districts, it is significantly less. Kapolei has provided a wide range of amenities to its residents, but this also attracts people from other areas which will begin to make traffic worse as more development completes. Being the furthest away from Downtown Honolulu, this distance creates an issue for residents to commute to and from Honolulu quickly. An earlier chart showed us that the average driving time to work was about 25.5 minutes for Hawaii, residents commuting from Kapolei take upwards of 30 – 45 minutes. For many of these reasons, Kapolei was chosen as the best site for implementing a comparative study that will use different housing types to reduce sprawl issues in the area. Both Kapolei's continuing growth and growing problems have attributed to this selection. The next step will be explain the specific site selection within Kapolei and the comparative study research.

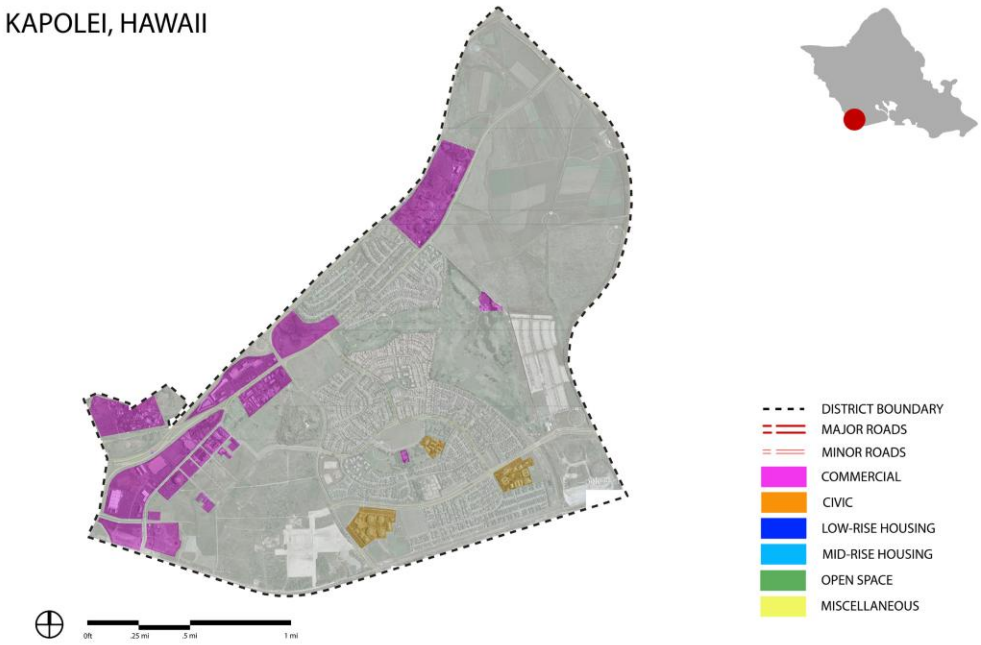


Figure 29 Kapolei map of commercial and civic space.

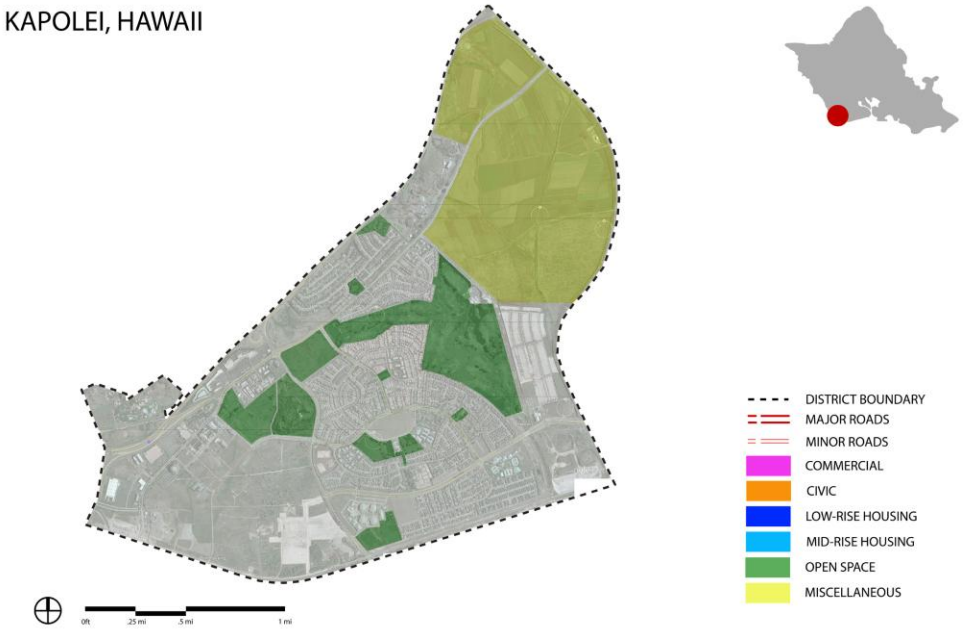


Figure 30 Kapolei map of green and open space.

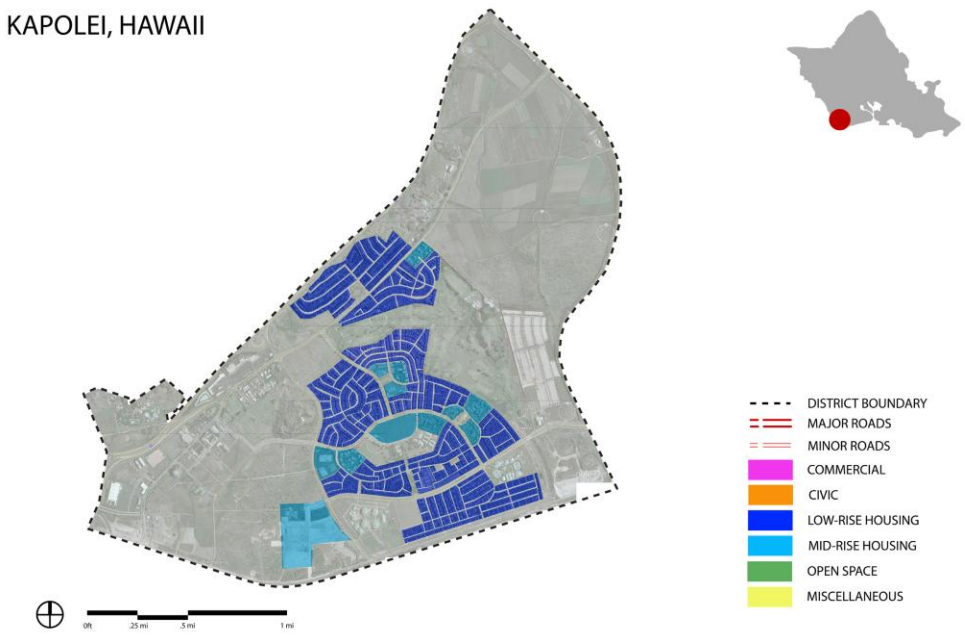


Figure 31 Kapolei map of housing.

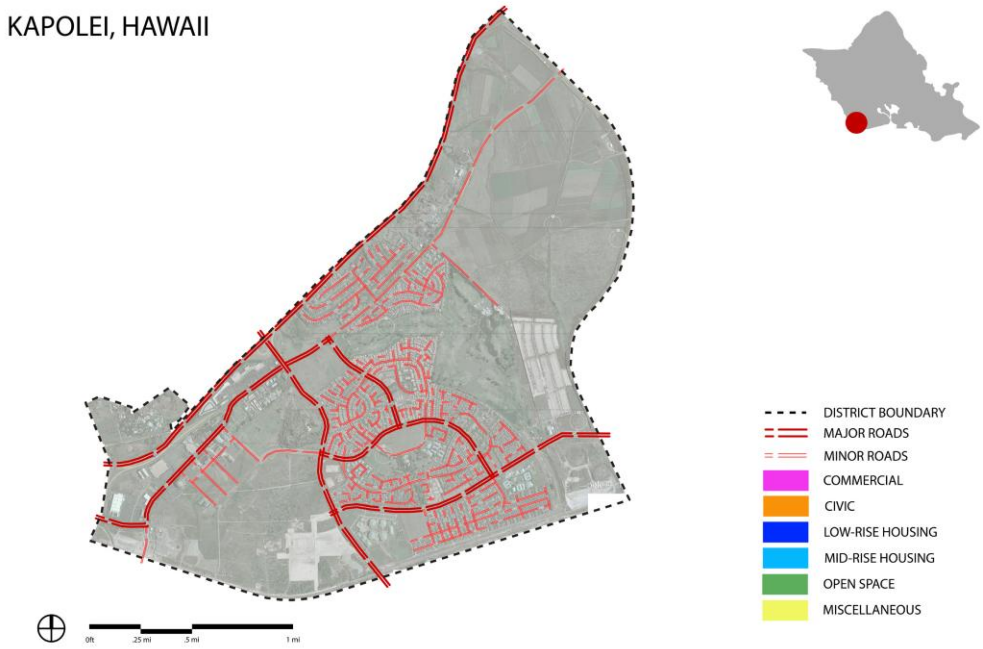


Figure 32 Kapolei map of major and minor roads.

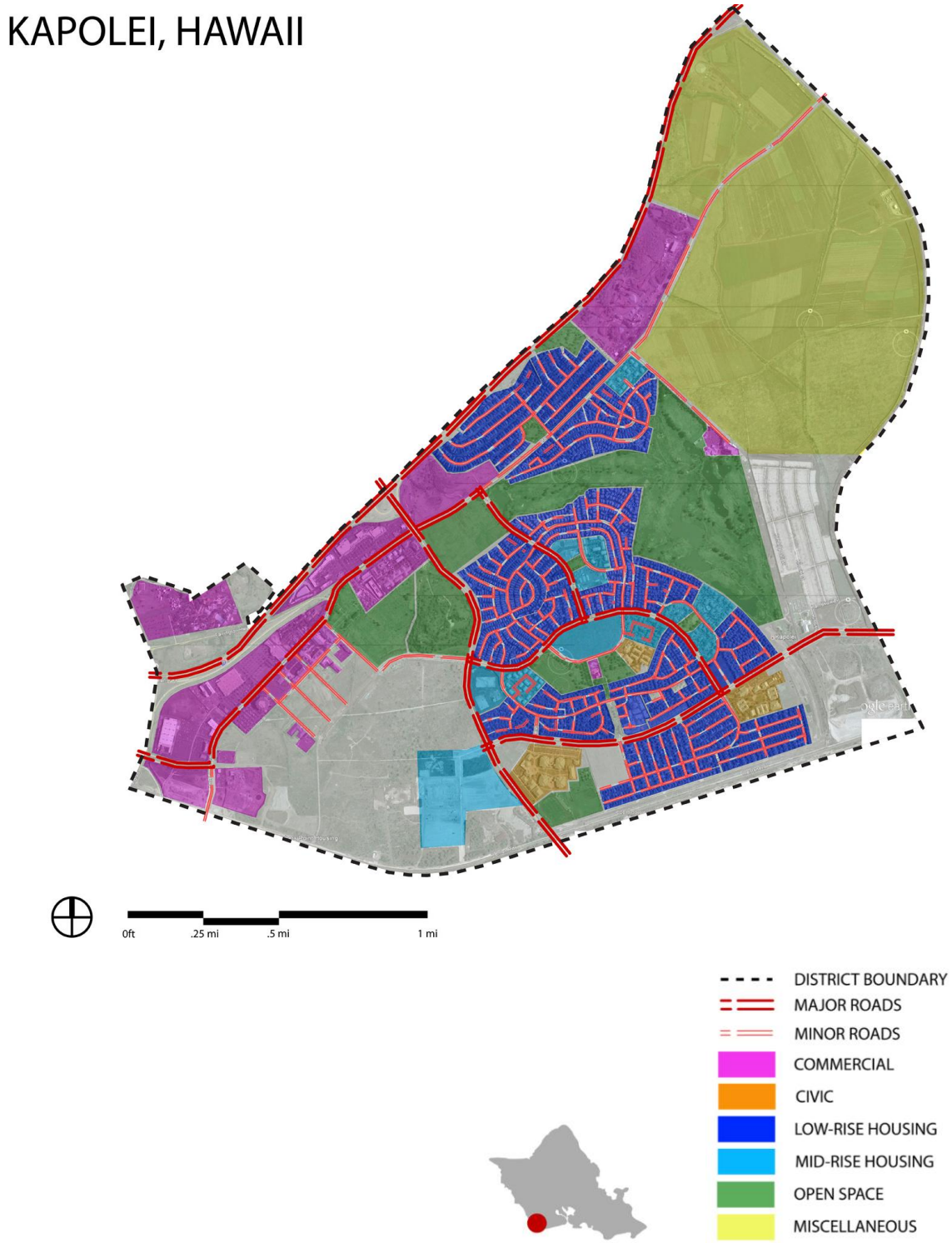


Figure 33 Kapolei map of all uses.

COMPARATIVE STUDIES

While searching for the site that would be appropriate for the study, I wanted one that could tie into multiple amenities. The chosen site is shown below in Figure 33. Along with the site location, we also show the approximate distances one would travel from that site to get to the surrounding amenities.

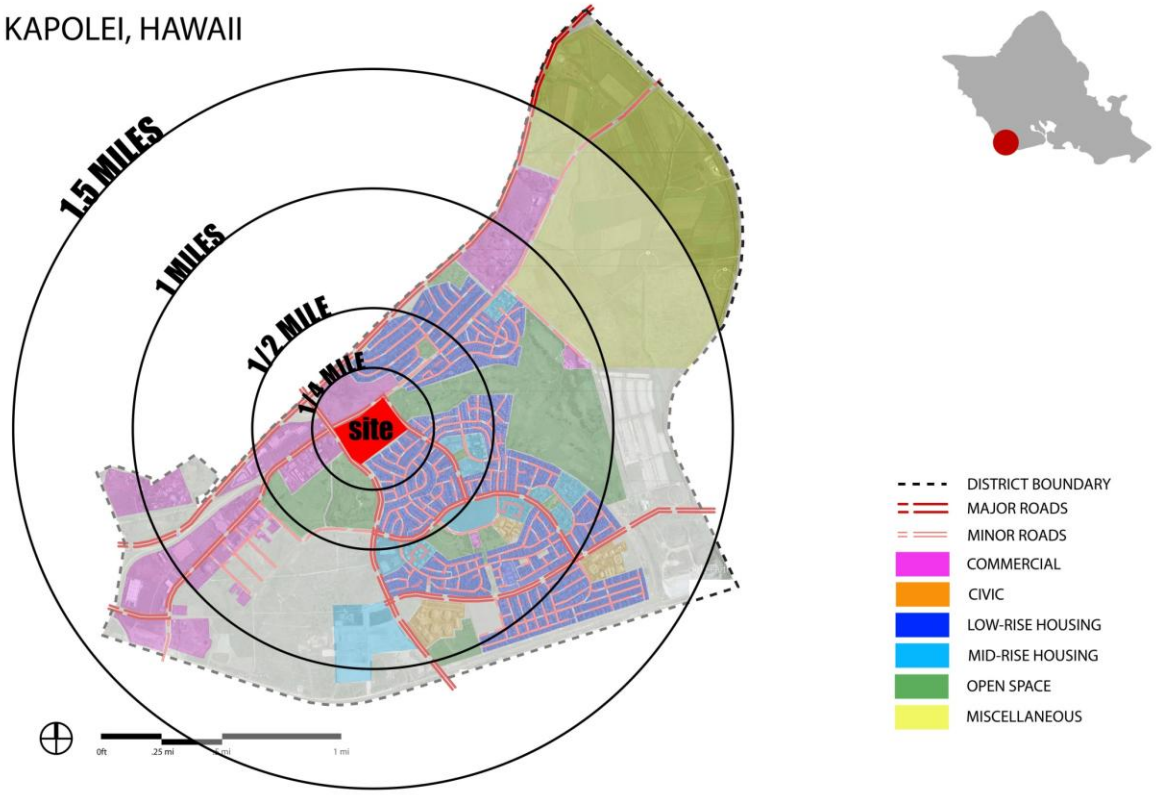


Figure 34 Diagram showing location of the selected site in Kapolei. Rings represent the diameter of distance one would have to travel from the chosen site to get to certain surroundings.

The chosen site is currently an open field that is bordered on one side by a concrete wall separating it from housing. The other three sides are bordered by main roads. To the east there is a golf course, west, some commercial buildings, and to the north is a Wal-Mart. Just north-west of the site is the beginning of the shopping center. Figure 33 shows us that a person standing in the center of the site would be within the ¼ mile walking distance to the Wal-mart and shopping center, making it very convenient to walk to.

If we look at Figure 35 below, we see the projected master plan of Kapolei. Not only do the boundaries of Kapolei begin to expand, but we see a majority of the new development is housing. This makes it even more crucial that this study shows how much more effective the housing types can be while at the same time reducing the issues of sprawl.

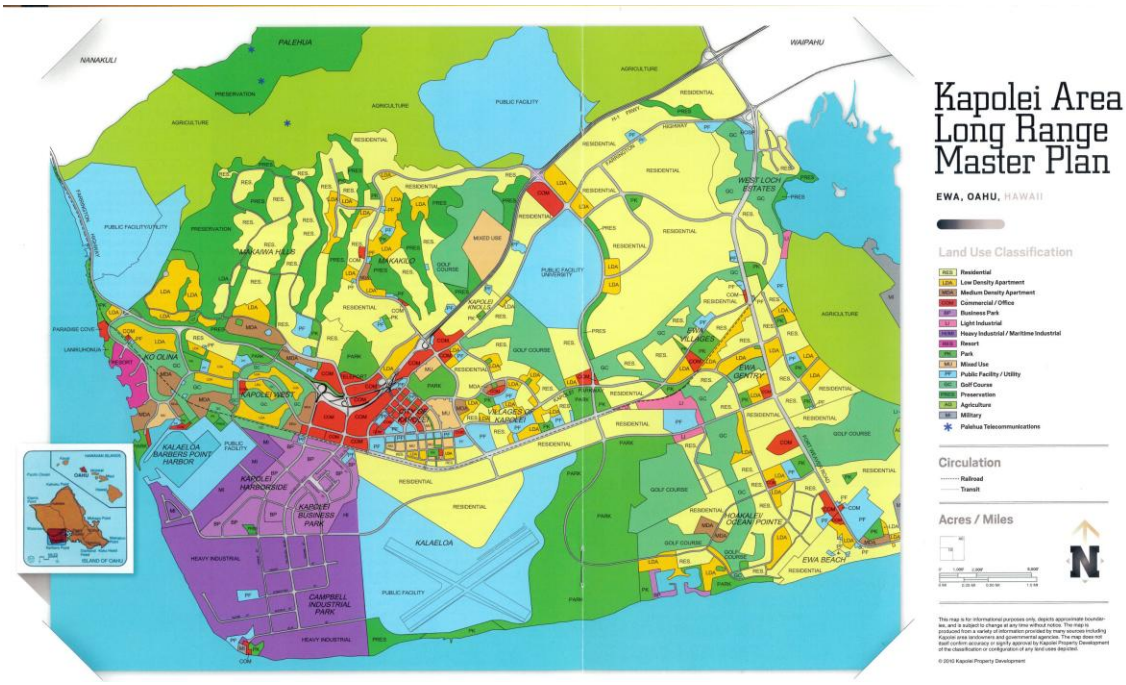


Figure 35 Kapolei area long range Master Plan.

The purpose of this comparative study is to get a feel for the different levels of density certain housing types can provide. At the same time, I will be looking at how the ideas we researched early on can be implemented to tie the site to the surrounding amenities and existing houses. There are many of projects that are mixed use and “Smart Growth” oriented, but this study will attempt a different approach. I would like to first show what the housing type looks like in its typical context and gather data on the percentages of green space, hardscape, and housing. From here we can get a feel for the layout and certain pros or cons about how the housing type is normally found in an urban context. We will then take that plan and modify it with concepts we have gathered throughout the research and then re-gather the same information. This will be a comparison of itself in terms of how the site is improved as well as its ability to reduce the same issues of sprawl. This will be repeated for all four sites, and in the end we will be able to see the benefits, improvements, and limitations each site has to mitigate sprawl.

THE SINGLE-FAMILY HOUSE

The first housing type up for comparison is the single-family house. This is the least dense housing type in terms of units per acre. This is also the standard setting of Urban Sprawl. Rubber stamp like rows of housing seems to fill up a never-ending amount of space. Using the existing layout of homes in Kapolei near the chosen site a layout was developed in order to fill the space with as many housing units as possible. The layout shows us widened roads for cars, while the sidewalk is reduced to about three feet. With the roads designed for automobile travel, the long paths and dead end streets make it unfriendly and inconvenient for pedestrians to travel along. The cul-de-sac ends with a house, where it would be much more for a pedestrian to be able to walk through. If someone did choose to travel, they would have to first navigate out of the neighborhood before taking a straight path to their destination. In this case, the percentage of open space is designated to the private lawns and backyards of each home, although not all of it remains green space. In this instance, there is no public open space, and children are reduced to playing in the streets where it is unsafe.

Figure 36 Basic single-family housing layout.

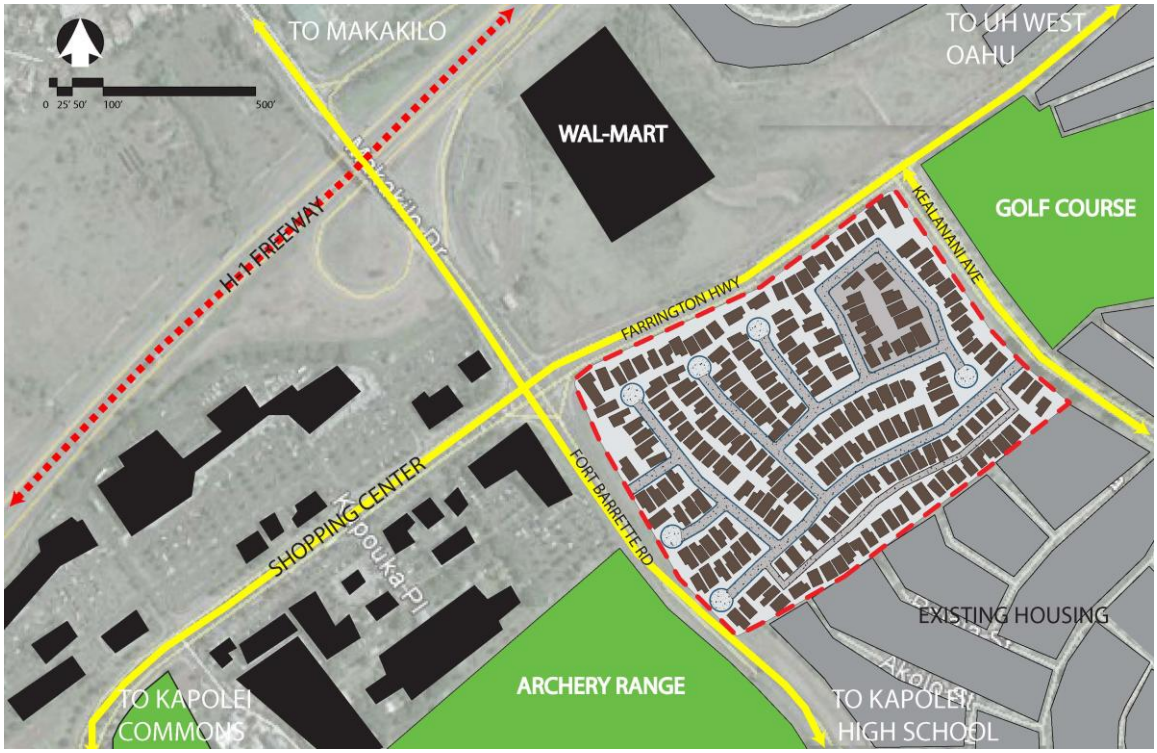


Figure 37 Basic single-family housing layout on site plan.

When placing the layout in the site plan, we see that walking is clearly inconvenient for people living deeper within the site. Although the site is only across the street, the rows of houses act as a barrier, trapping the pedestrian within the site and have no relationship with the amenities well within the quarter mile radius of the site. There is also little relationship to the existing community to the south of the site, as one would have to walk out a far greater distance. These things give the pedestrian little incentive to walk, and thus they choose to commute by car, even if the drive would be five minutes away. This also contributes to the social disconnection between neighbors within the entirety of the site and reduces it to a few houses around your own property.

Before we introduce the first of the four new schemes, it has been decided that when attempting to create a sense of community for the site within each housing type, a specific area is designated the “flexible urban community space.” In keeping this site the same, we keep the study honest and true by keeping the same amount of space constant for each housing type to be rearranged. This flexible community space is in theory a space in which can fit all contexts and is driven by the community wants and needs. This space will also reach out beyond the community and create a relationship

with the greater Kapolei that will lead to more social interaction not only within the site but with a wider radius of people.

The intent for this community space is that it will always be changing depending on the events being held within it. Throughout the research timeline, I have been able to frequent many local events in similar spaces. I feel that these events have become very popular in the past year. Some event names that come to mind are the Honolulu Night Market, Eat the Street, First Friday, various “pop-up” type events that only last a day to a few nights. These type of events not only reinvent the spaces they are in, but they promote local vendors, artists, musicians, and invite people in the surrounding communities. One site in particular that is a sort of experiment in the uplifting of Kakaako changes from desolate to thriving over a matter of hours as a small street block becomes what is called the “Honolulu Night Market.”
By having an area and a few spaces that can be widely diversified with these type of events it opens a door to a number of other community driven activities. These could include craft fairs and farmers markets, or even small fun and game type events that cater to the whole family. This space is great because it will become a space that the community will build on their own that will ultimately cater to the diverse needs of a community.

We also must validate that the position of such a space is appropriate for our goals in reducing the negative effects sprawl has on a community. There are three potential places the space can go because they each promote a different sense of what residents the site will be inviting to. It can act as a cornerstone which connects the residents to the existing amenities, and can be placed in the center as a space where it becomes equidistant for a resident on any corner of the site to walk to, and lastly, it can be placed in the center area between this new community and the existing community given that the concrete wall is taken down. Placing the site in the center of the two communities

Figure 38 Top four images are various photos of activities which take place at the "Honolulu Night Market." Below is an image at the "Eat the Street Event."

would reserve it to be used only by those residents unless promoted beyond. This would create a situation in which a large amount of vehicles flood the area because they live outside the walking distance. Even if it creates a great deal of a sense of community for those immediate to the site, it does not contribute to the greater district area. By placing the community space in the center it reiterates the same problems but deals with a smaller community having the same size problem of cars and such in the area. By placing it at the north-west corner of the site, it has a relationship to the other three corners of amenities. If events are held here, people outside the immediate community

can see what's going on and people driving will be able to utilize the large parking lots at the shopping center and Wal-Mart. This would be a self-promoter for the diverse activities that take place within. Since one of the issues when dealing with activities occurring next to housing is noise level, a wide park space will be used as a barrier to mitigate sound. This will also be reiterated in each "new" site layout for each housing type.

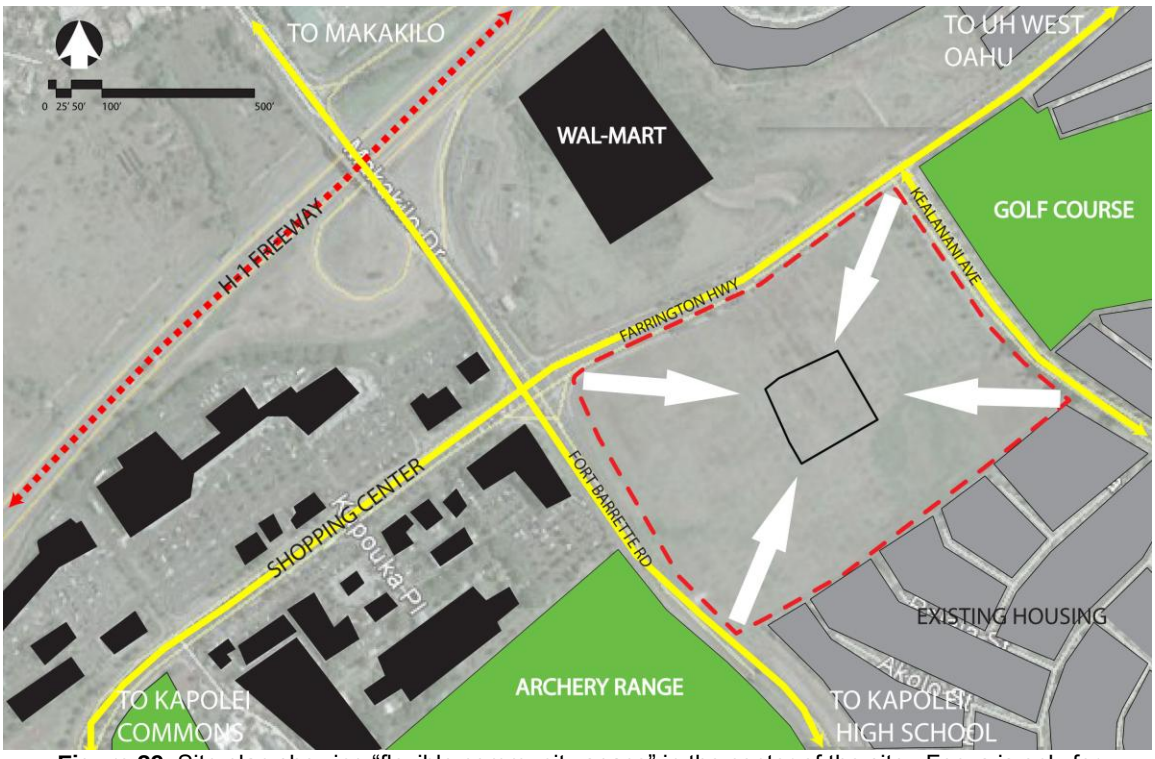


Figure 39 Site plan showing "flexible community space" in the center of the site. Focus is only for residence within the site.

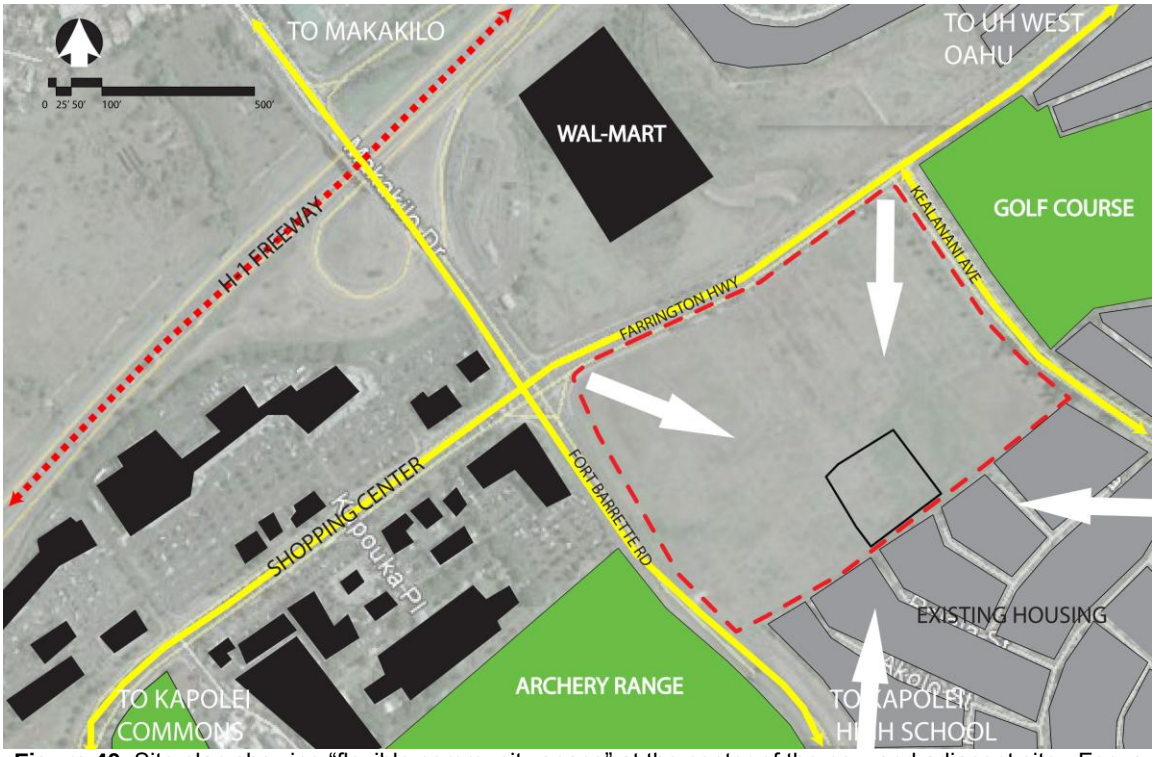


Figure 40 Site plan showing "flexible community space" at the center of the new and adjacent site. Focus is inward between the two sites, but not inviting to people living outside these sites.

Figure 41 Improved single-family layout.

Looking at the new site layout that has been created using the same structure in the clusters of houses and implementing we can begin to see a site that works in a positive way. Although we do lose some density in the number of units on the site, we have created a site that gives the resident much more incentive to travel by foot rather than vehicle. Park space is placed in a way to relieve the pedestrian of continuing down the path of housing that would otherwise be boring. These parks also serve as a pass-through to dramatically shorten the distance one should travel. The increased width in the sidewalk also makes it a place that is more inviting for social interaction with other residents. These “short-cuts” also appeal to the residents in the existing community, as they can now pass through this new site to access the nearby amenities. As we see in the sections below we get a feel for how the space promotes more pedestrian activity. Younger children now have the opportunity to play in safe grassy areas away from the cars and close to their homes. The street width is also reduced to only being a place for cars to pass-through and not become a parking lot. These things all begin to push out the ideals that a modern family would have and promote a different life style.

This also shows us the limitations of the housing type. Being that it is a single unit that occupies a large plot of land, there is no opportunity to increase the units by extending either horizontally or vertically. It is the nature of the single family housing type that cannot be avoided.

Figure 42 Improved single-family layout on site plan.

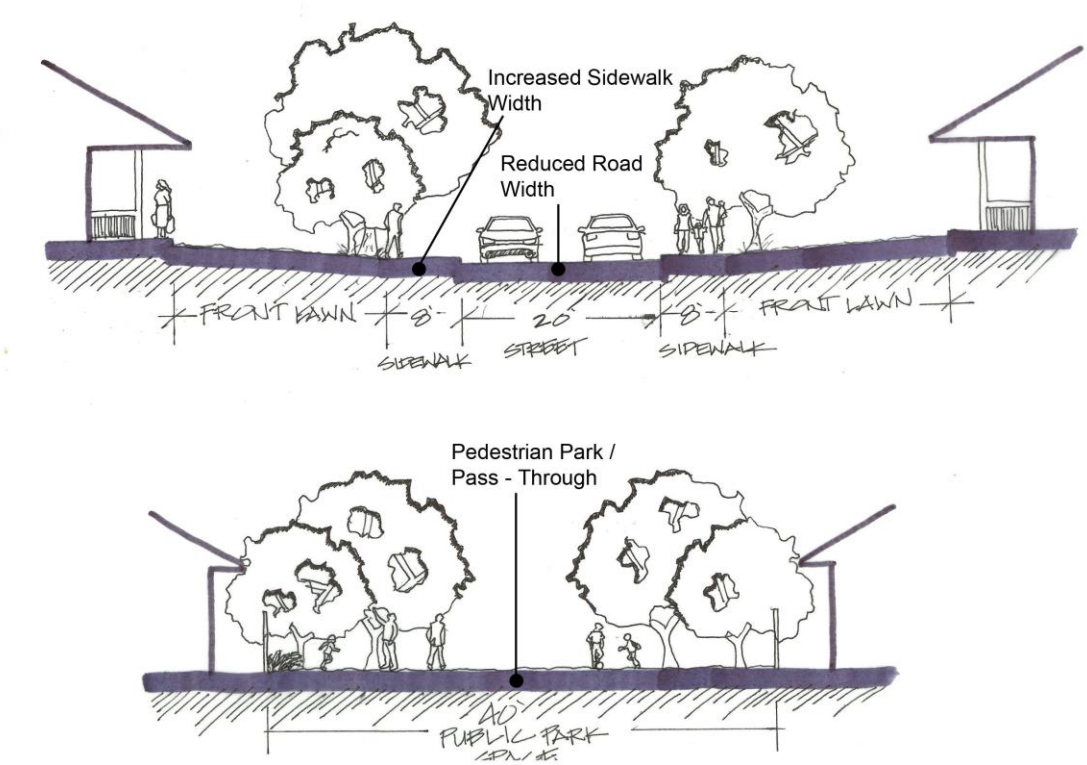


Figure 43 Single-family site sections of housing and street relation as well as intermediate park/ pedestrian pathway.

THE ROW HOUSE

The next housing type is the row house. Similar to the one unit per plot characteristic of the single family home, the form is a bit different. They eliminate the front lawn, reduce the footprint, increase the number of floors, and share the adjoin side walls with another home. What we see in the first layout taken from a few blocks in San Francisco is a non-uniform grouping of units. Sometimes from the street, these lack of uniformity can be quite beautiful, but in many cases as we see in the layout, is unappealing. Although the streets are gridded to make navigation easier, they are still long and give the pedestrian little or no sidewalk space. There is also a lack of open space. Much like the single family home, the row house suffers the same problems. It looks like a denser community but actually is not much different in terms of the units per acre. It is still a place where the automobile is priority over the residents. There is relatively more incentive for people in the site to walk to the amenities, but it would provide little social interaction and pedestrian experience.

Figure 44 Aerial shot of row houses in San Francisco used for study.

Figure 45 Mission Street row houses used as precedent study

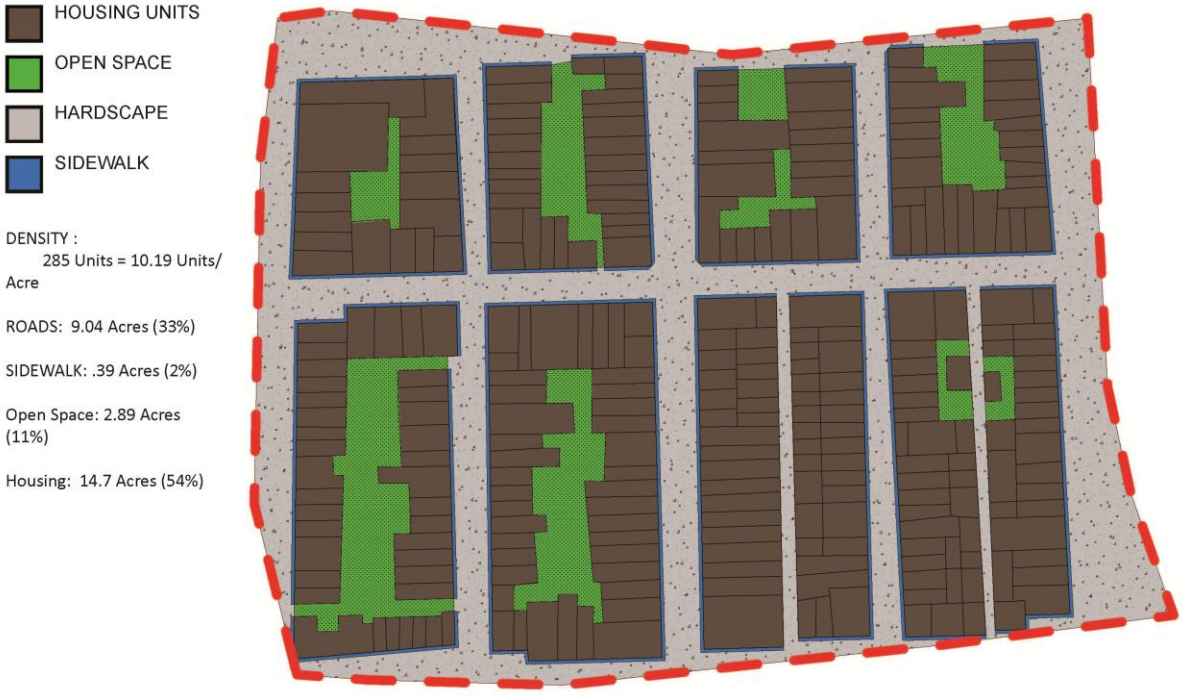


Figure 46 Basic row house layout.

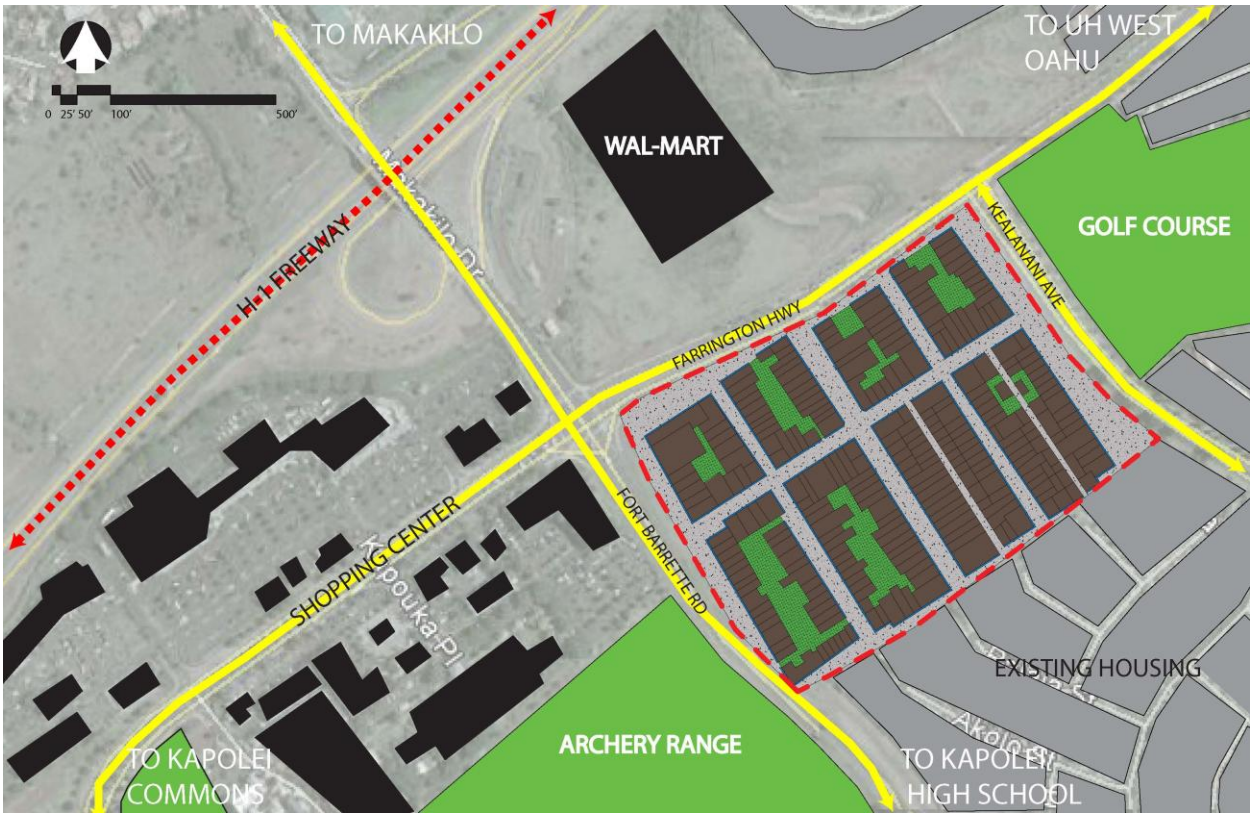


Figure 47 Basic row house layout on site plan.

Figure 48 Improved row house layout.

In the new layout for the row house, we use similar modifications that we used in the single family plan. Parkways provide a place for kids to play, sociable space, and a shortcut to shorten the distance a resident living deeper in the site would need to travel. Only a few entries to the site by car are provided to limit the cross-through to a small percentage of people who do not live in the site. The percentage of roads is greatly decreased and the sidewalk space is again increased for larger pedestrian flow. We still see similar limitations that the single family house experienced in its inability to further densify and provide open space at the same time. In the site plan, we see that the straight roads give the pedestrian direct access to the surrounding amenities, and further make walkability a larger incentive. We again take the cars off of parking on the street and onto the individual properties as shown in the section.

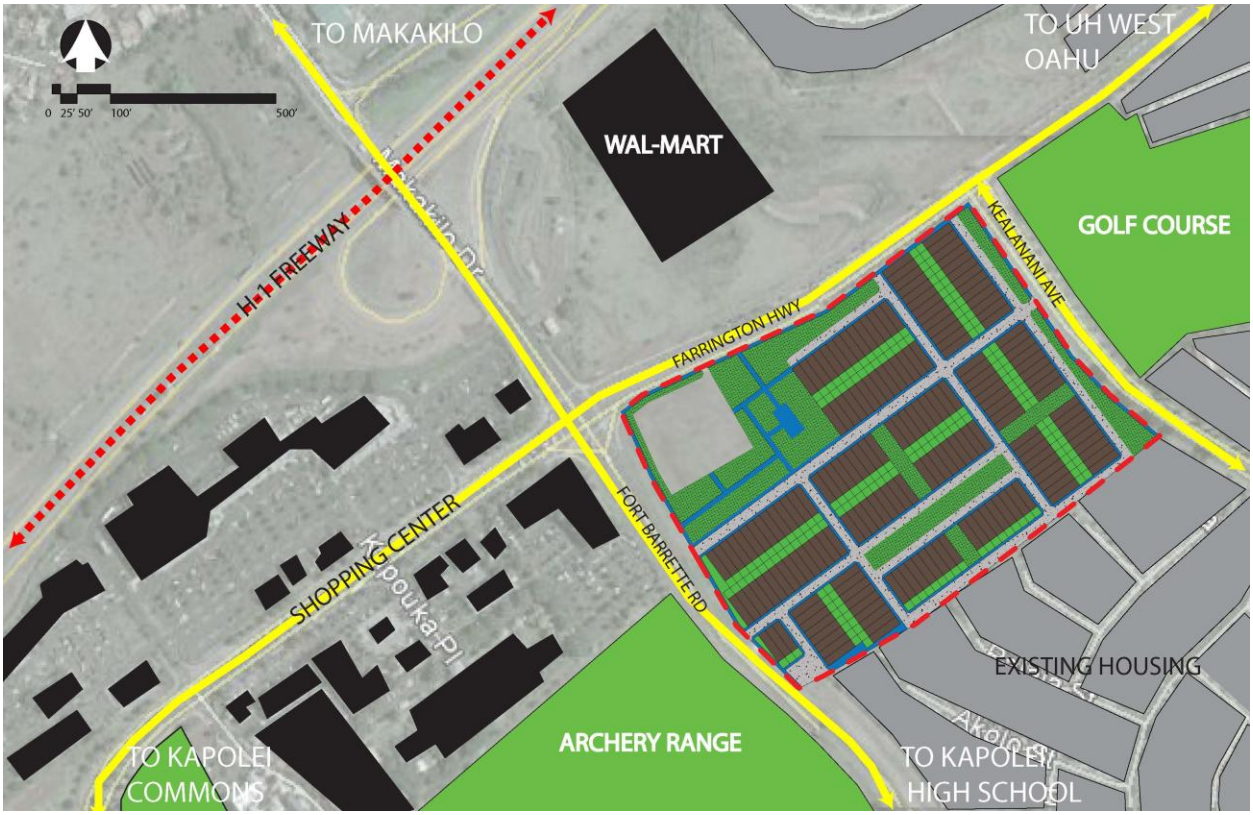


Figure 49 Improved row house layout on site plan.

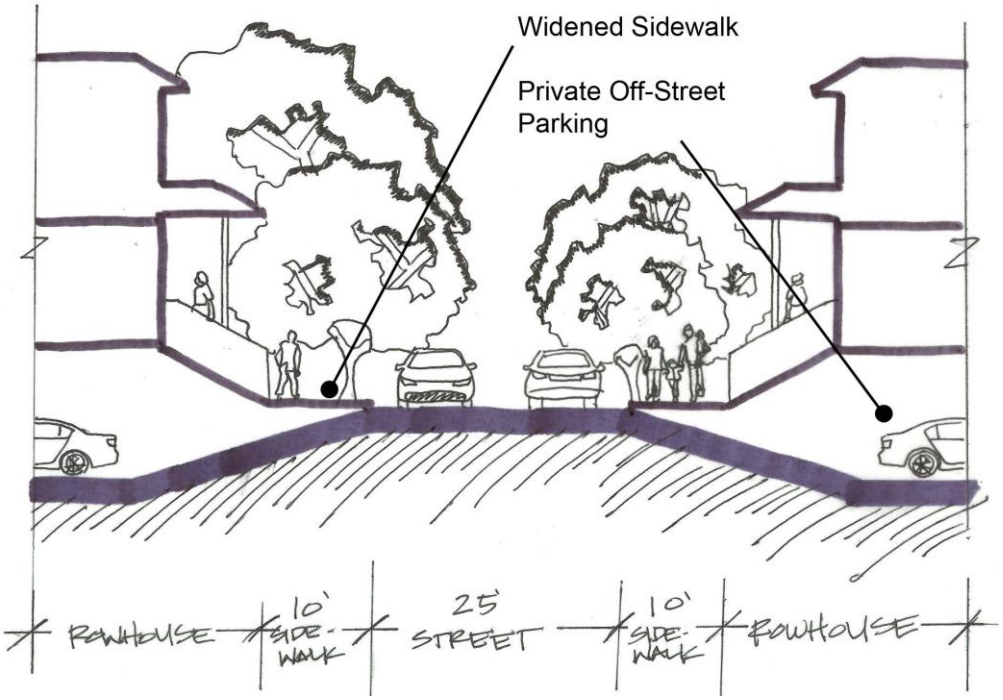


Figure 50 Section of row house to street relationship.

THE APARTMENT

The apartment housing type is the most dense of the four housing types. I copied the layout from a few blocks located in the Soho district of New York. The streets feel slightly crowded because of the height of the buildings. The streets are made much smaller when they are lined with cars. There is very little space for children to play and parks are not always close enough where parents are comfortable to let them go on their own. This brings us back to Clarence Perry's point on apartments having a problem of bringing so much people together but lacking sufficient social space for the people who live in the area. As we see in the layout taken from Soho, the apartment typology takes up almost the entire block. Similar to the initial layout of the row house, the blocks seem to be made up of dissimilar buildings. This leads to difficulty in determining a density. When observing the apartment layout on the site plan, we see that the tall buildings would cut off views to the mountains. Although the density is undetermined, having a higher amount of people in one area along with having less parking for cars will lead to flooded streets and increased traffic in the area.

Figure 51 Aerial shot of Soho district in New York for study.

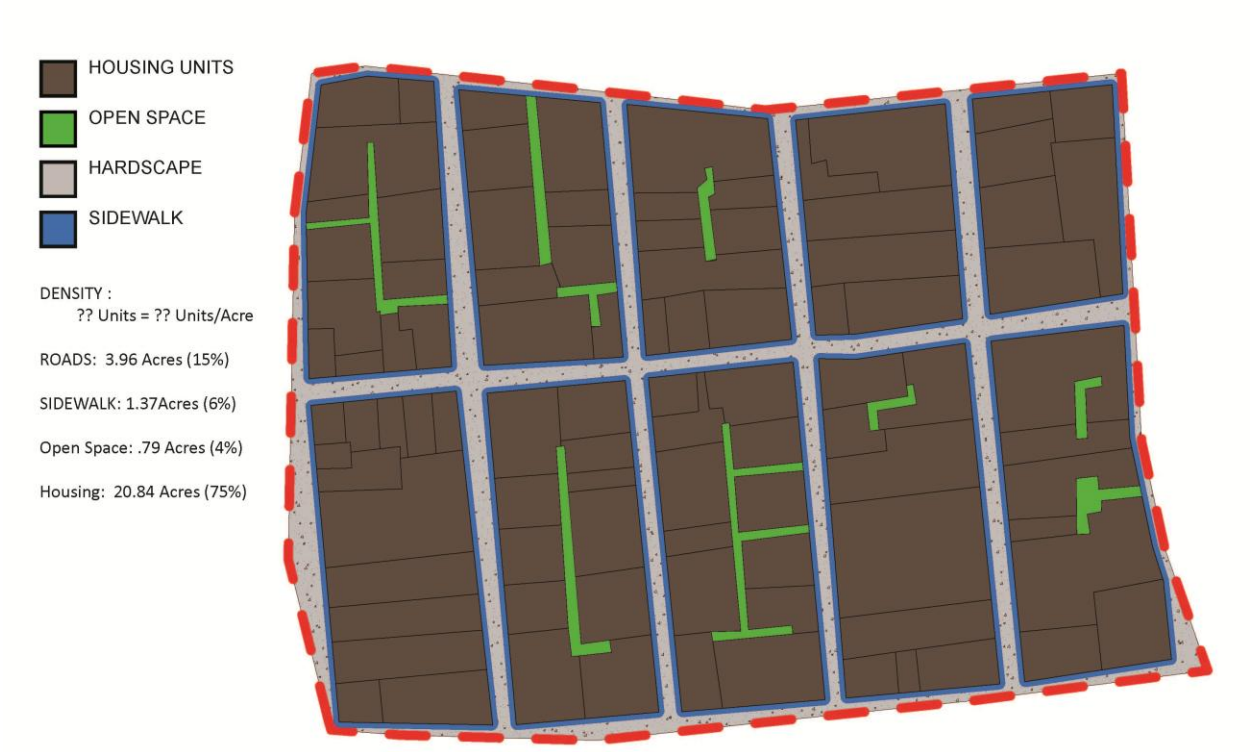


Figure 52 Basic apartment housing layout.

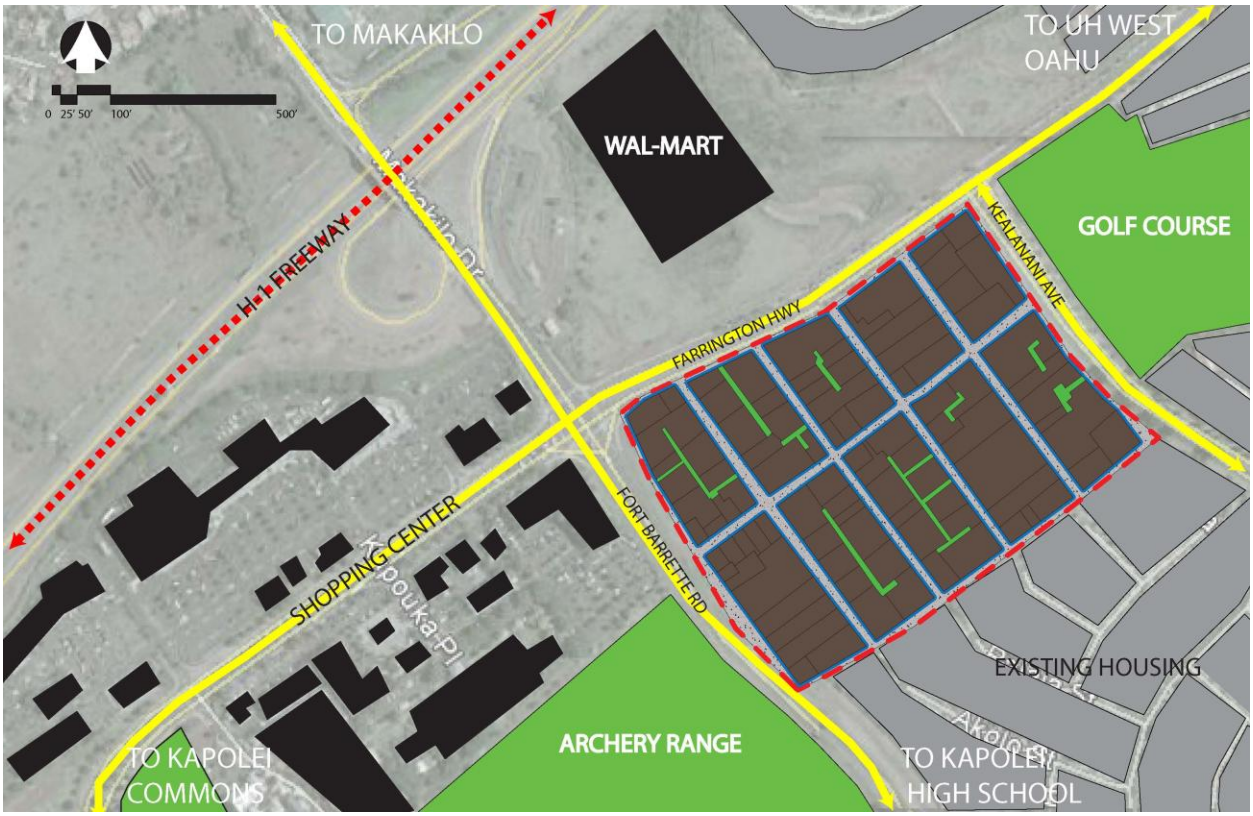


Figure 53 Basic apartment housing layout on site plan.

In the new plan for the apartment housing type I focused on getting the cars off the street, introducing ample open space, and again providing walkability throughout the site. The Yerba Buena lofts are used as a precedent for the buildings as well as the size of the unit themselves. The units are all the same size at approximately 1250 square feet. With its modular size, it would be easy to both widen and heighten the unit to double. Each building has its own access to the parking lot from the street. Like the other plans, we want to widen the streets for activity and created social spaces all around the living areas. In this case, the streets are widened a bit along with the sidewalks to create views towards the mountain and the building is kept down to 4 stories.

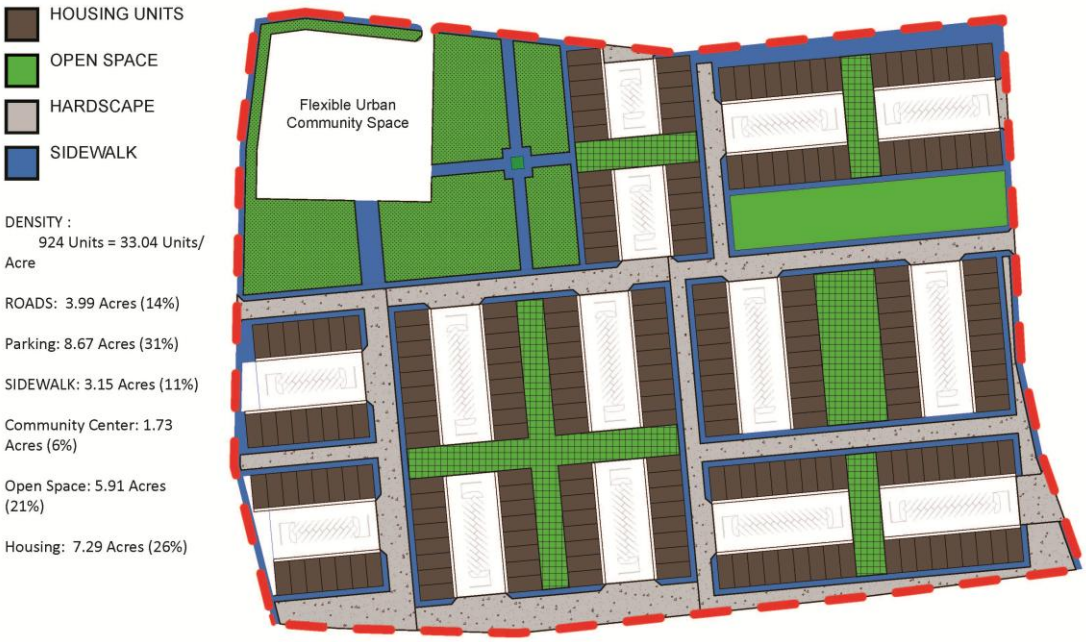


Figure 54 Improved apartment housing layout.

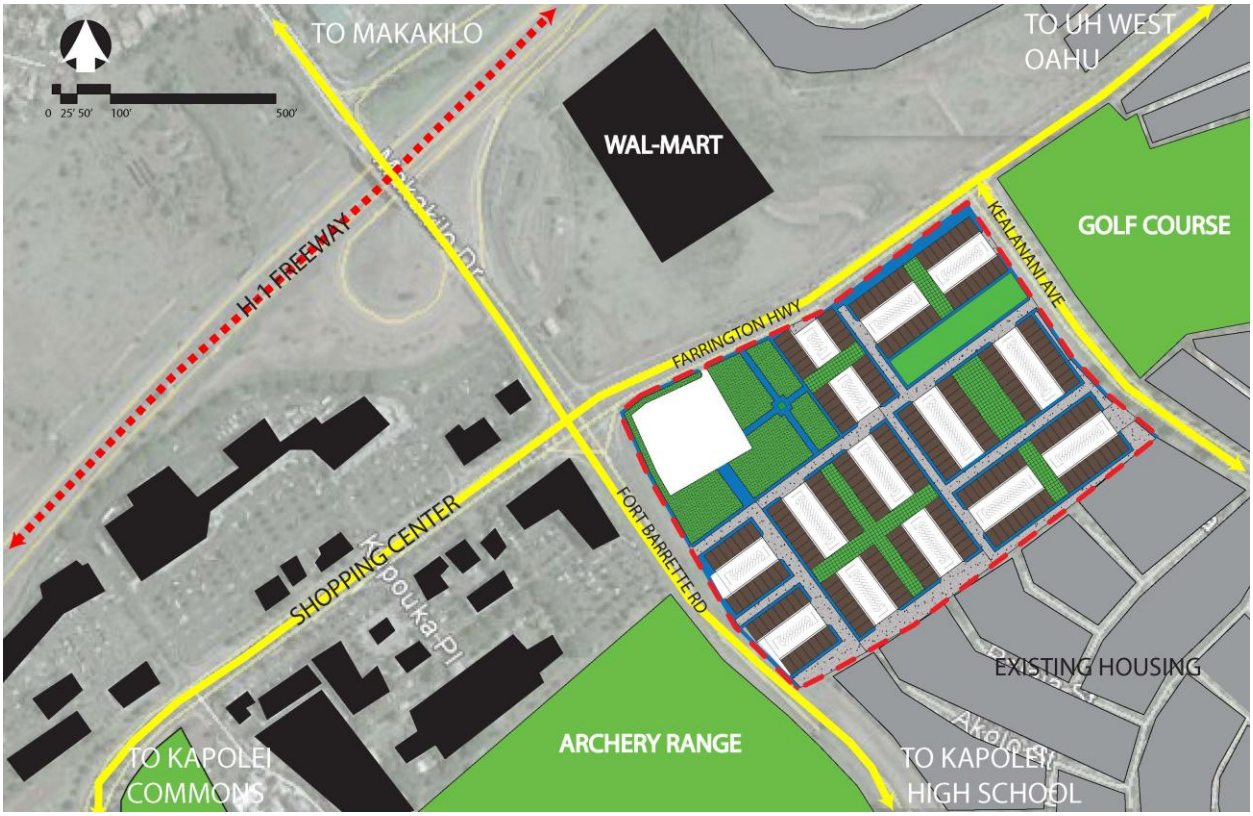


Figure 55 Improved apartment housing layout on sight plan.

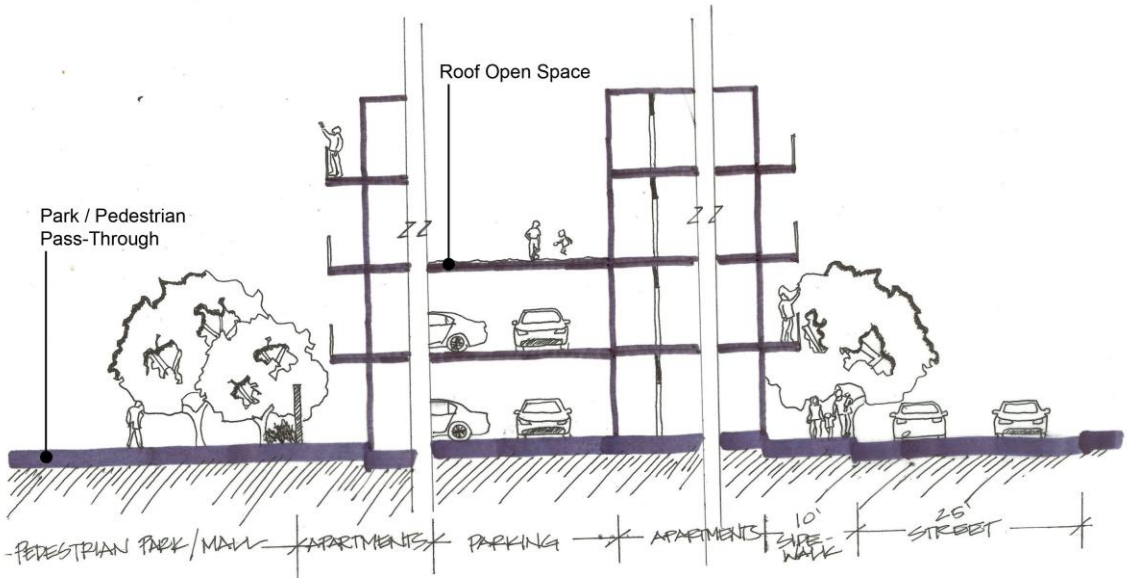


Figure 56 Site section of apartments relation with the street front as well as the large interior park and pathway.

CLUSTER HOUSING

The last of the four housing types is the clustered housing type. The precedent, the Asian Games Village, by Raj Rewal was studied to get a building type for the comparison. This was a special case that was studied because unlike the other housing types, this development showcased a clustered style of housing units. It was also specifically designed to have pedestrian pathways and courtyards, along with community centers placed within the neighborhood. The clusters can have between four and six units depending on how many two story units are placed on top each other.[75] These same units are stacked, flipped, and rotated to create a wide array of pedestrian experiences. The plan also reserves the inner area for pedestrian only paths, while the automobile is not allowed to penetrate deep within the site. Along with the courtyards each unit is provided with open terrace space which allows for private open space. This plan proposes a density midway between the apartment and row house housing types. It also provides much more open space. Although the plan is good as it stands, it can be utilized and improved for use on our site in Kapolei.

[75] Khan, Hasan-Uddin. Rewal's Asian Games Housing. MIMAR 7: Architecture in Development. Singapore: Concept Media Ltd, 1983. Page 54

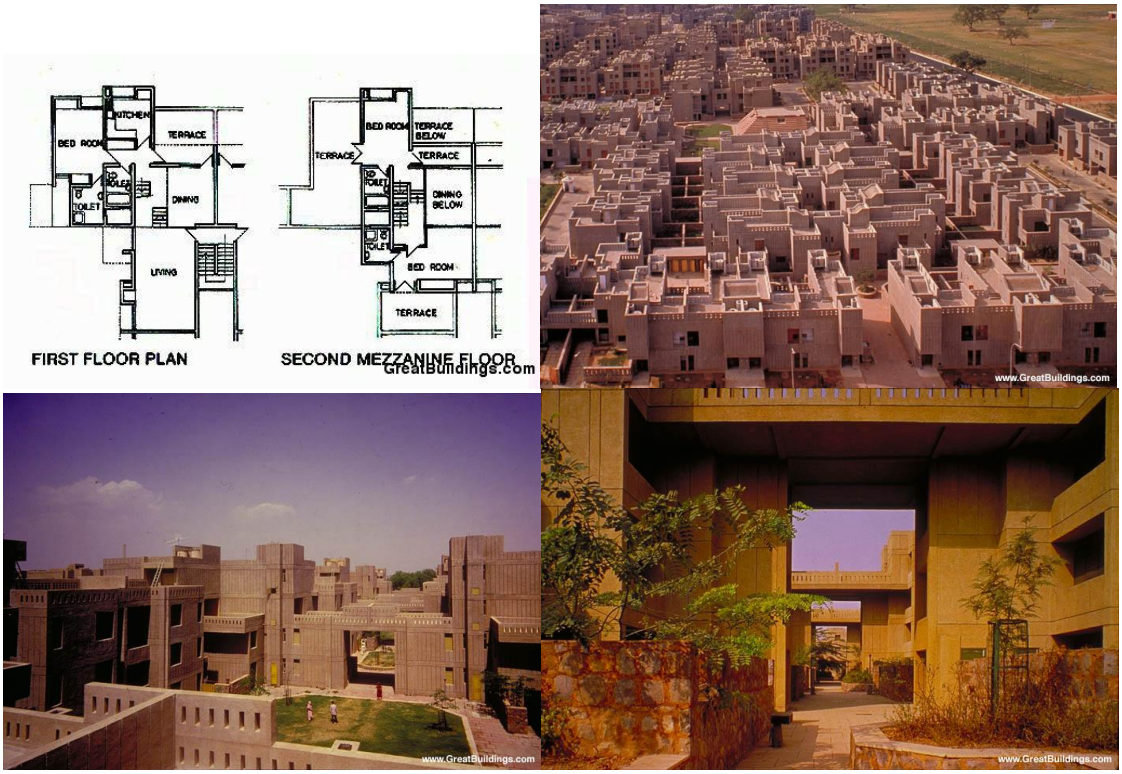


Figure 57 From left to right, top to bottom. 1) Plans for a single unit that are then clustered and stacked to create density. 2) Aerial shot of Asian Game Village. 3) View from roof terrace into interior courtyard. 4) View from pedestrian path walking through courtyard.

Figure 58 Original clustered housing layout.

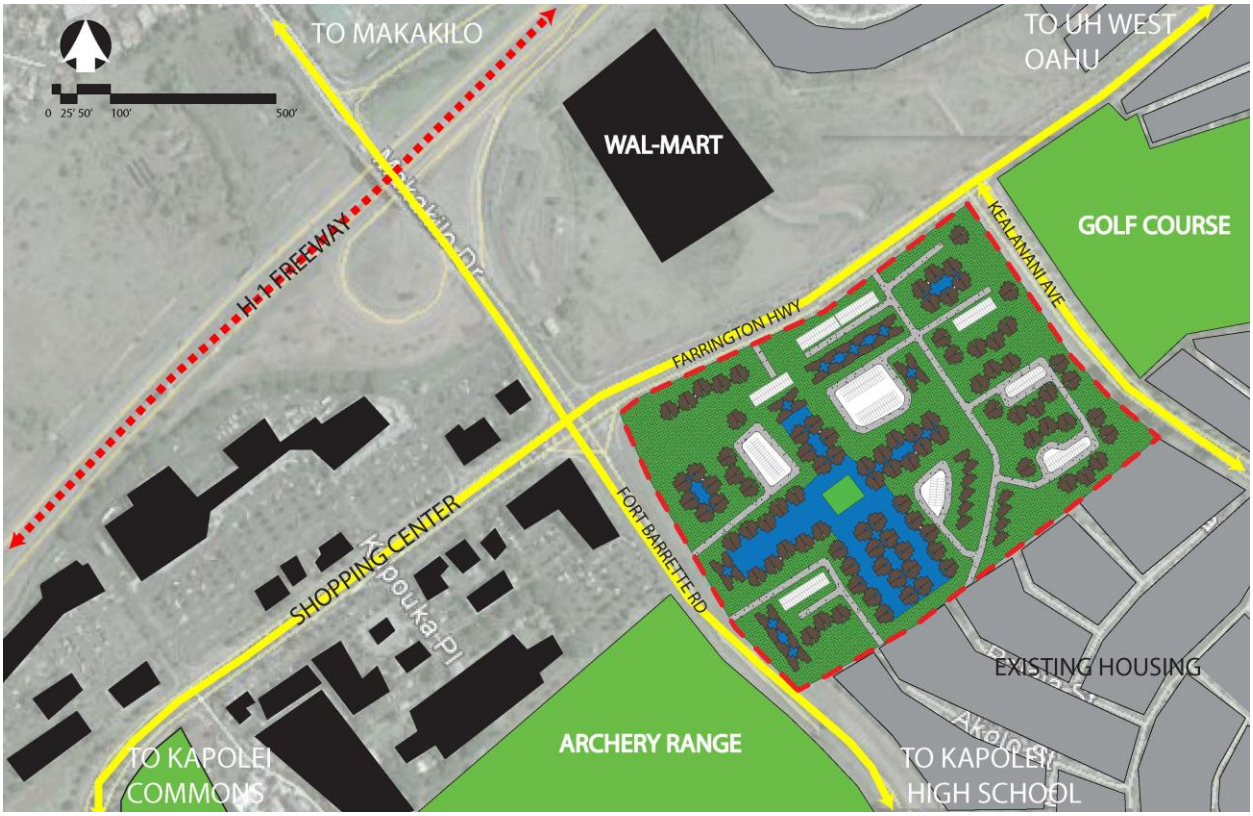


Figure 59 Original clustered housing layout on site plan.

In the new plan for this clustered housing type, we better aligned the buildings to create a grid like structure for the pedestrian paths. We also reduced the automobile to only occupying three relatively small corners of the site. The density of units was raised just a bit, but this plan allows for much more open space. This open space can be used for a number of things being gardens, play space, or become extensions of the community space. With support from the clustered building type, pedestrians now have the opportunity for social interaction both vertically and horizontally. In relation to the surroundings of the site, a person living both within and outside of the site will have no problem traveling by foot.

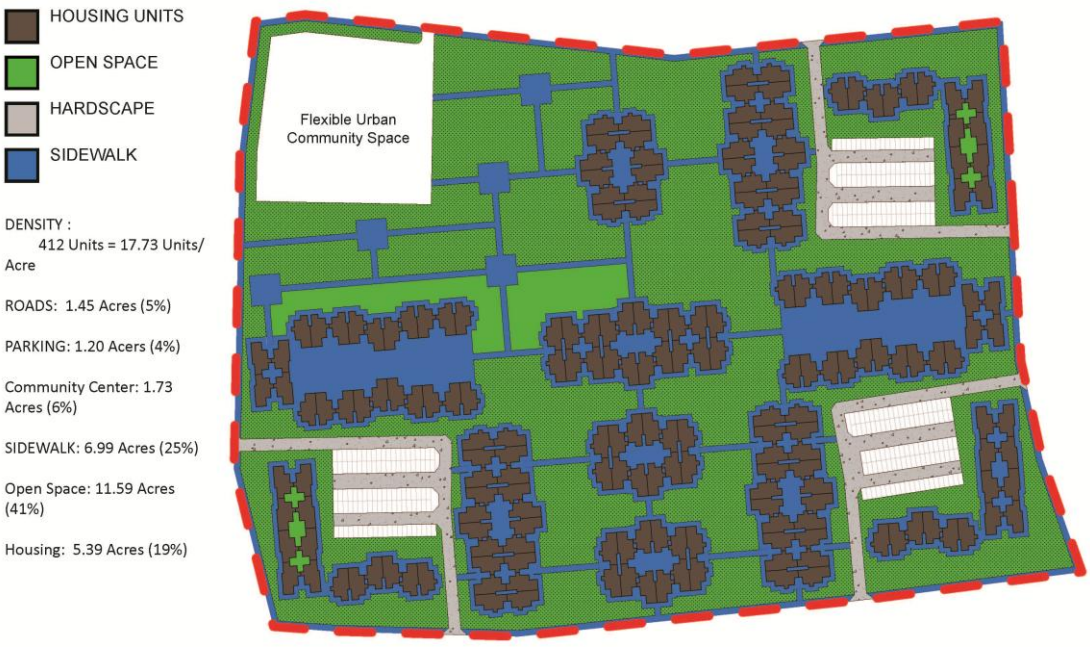


Figure 60 Improved clustered housing layout.

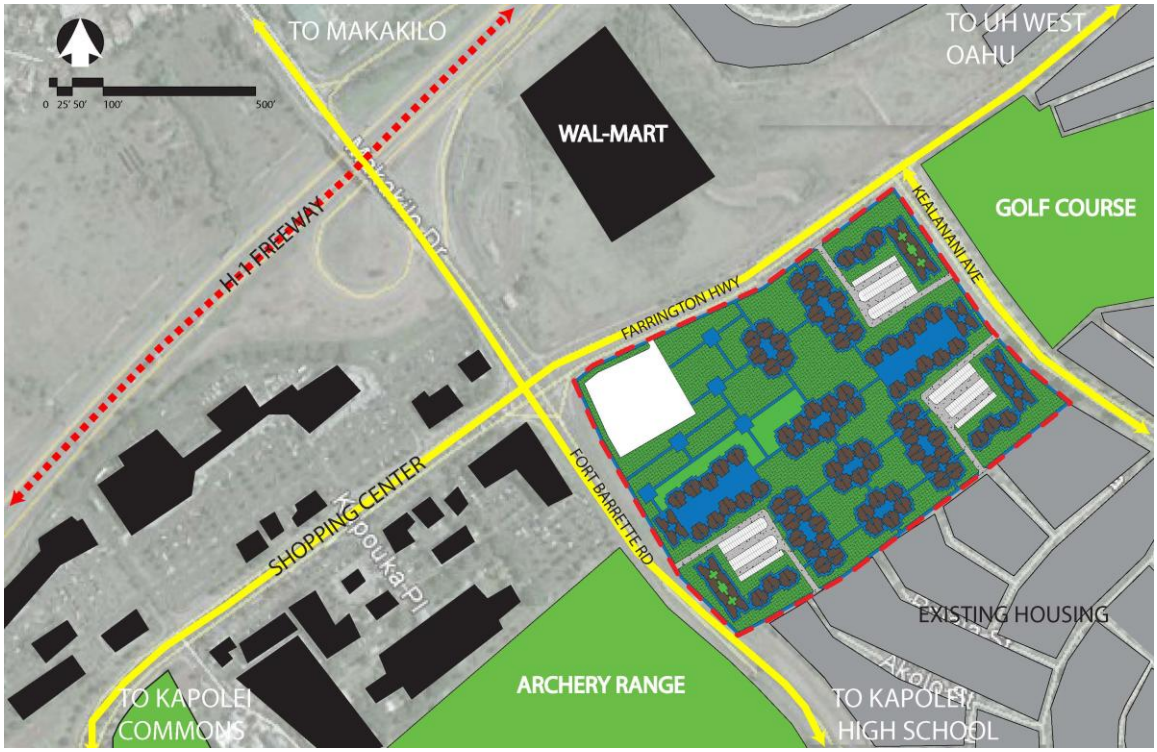


Figure 61 Improved clustered housing layout on the site plan.

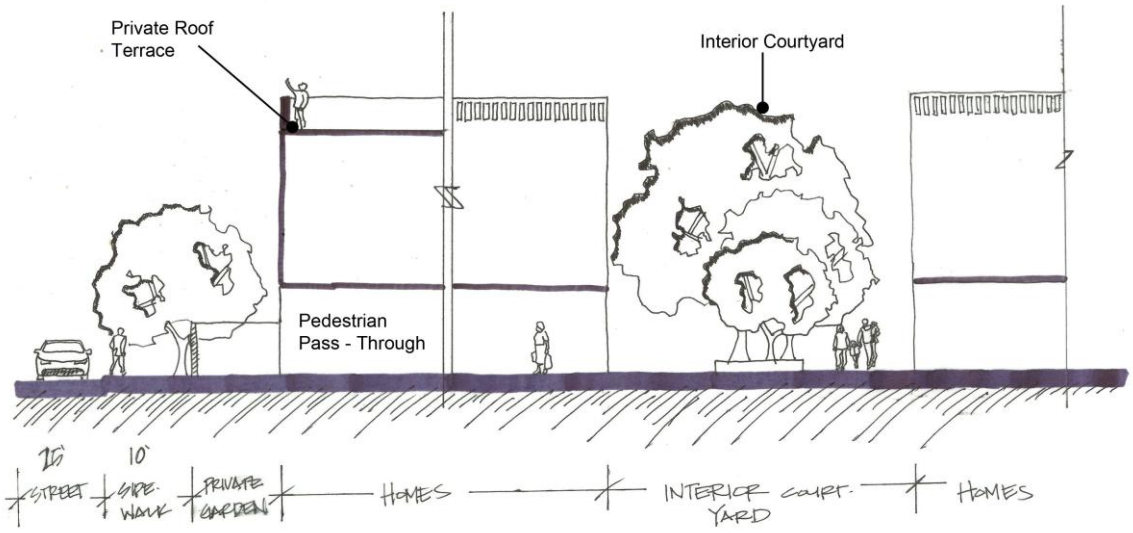


Figure 62 Site section from the clustered formed interior courtyard to the street by way of a pedestrian pass-through. The pass-through is formed when two modules of units connect.

COMPARISON OF SITES

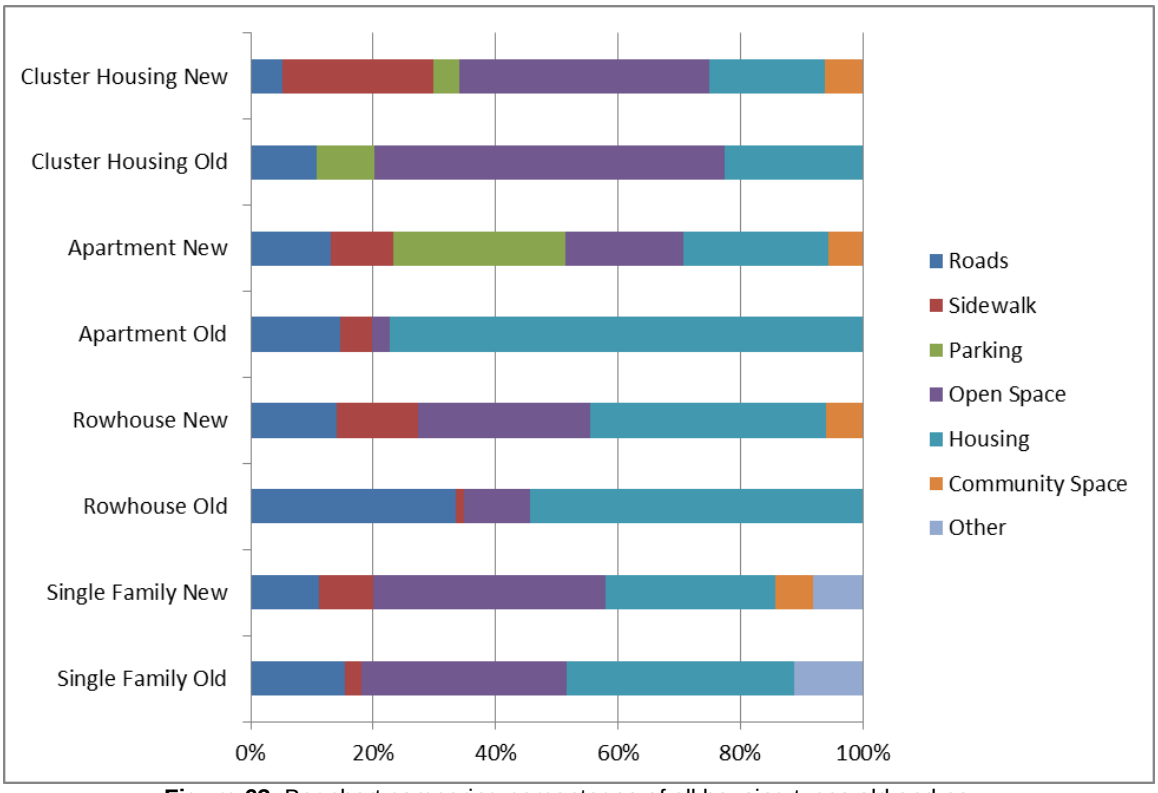


Figure 63 Bar chart comparing percentages of all housing types old and new.

Having done the initial phase of the comparative study, we now have a bounty of data that will allow us to do a multiple of things. We can now compare each housing type with itself by seeing the improvement in the site layout. We can see the exact percentages of increase or decrease in the density, open space, and hardscape. We can also compare the same data across all four sites. This allows us to make assumptions on each housing types limitations in reducing sprawl in Kapolei. Each housing type has its own nature that limits or allows them to expand, reduce in size, allow pedestrian experience, and allow space for cars. This becomes a launching point for design that involves all four housing types and reduce sprawl in areas that have varying levels of effect. This begins to push a door open that we have not seen in smart growth. While smart growth usually comes in the form of a new building type that promotes mixed use, this study will allow us to implement different housing types that appeal to a wider range of people. Pulling elements from various ideals, we make walkability a possibility and use existing amenities. If a site lacks amenities, we can

decide that they are needed to make the site work. This does not mean we need amenities directly on the site, but we can put them around the site. By the end of this analysis, we will be able to determine if at the same time of creating more open space, less impact of the automobile, and more walkability, if we can increase density. Altogether we want to increase density within a thriving city rather than letting those city boundaries spread with no end. Following are a number of diagrams that compare all the data gathered on each housing type both in its original form and new layout.

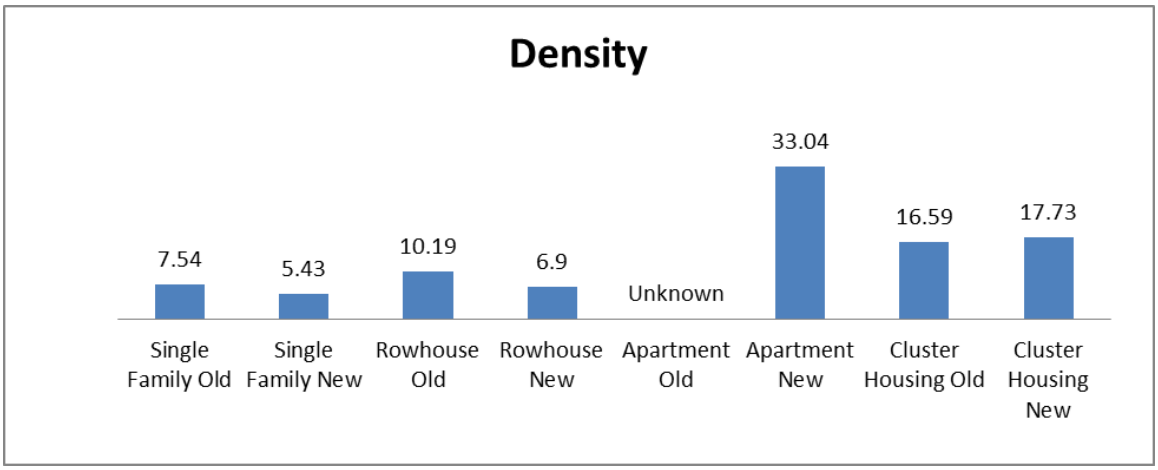


Figure 64 Bar chart comparing the unit density of the Kapolei site.

In terms of density, we did not increase the amount of units per acre in all cases with the exception of the clustered housing plan and we have no previous unit density to compare the apartment type on its own. Although we could not increase the housing density, we did reduce hardscape, provide an increased amount of open space, and also increased sidewalk space. This was done with each plan receiving the same space for the flexible community space. This where limitations of each housing type begin to show. While the clustered housing and the apartment housing density can increase along with the provision for more social spaces, the single-family and row house types are limited in their inability to densify vertically. They are limited in the sense that one unit is allowed per plot of land, while multiple units may be stacked in the other housing types. In terms of diminishing traffic issues in Kapolei, which may be a little hard to determine. There is an inability to force people to not use their cars because of the strong place the automobile has set itself in. We can only use design to provide as much incentive as possible to walk. To widen the affect for reducing sprawl beyond a city, we have to look at what kinds of jobs the people have in an area and how and where we can provide those jobs nearby. We also need more types of public transport. All of these things go beyond the scope of our study and require a lifetime of research for every situation throughout the U.S. We can clearly see a vast improvement overall in each housing type when we put the plans together.

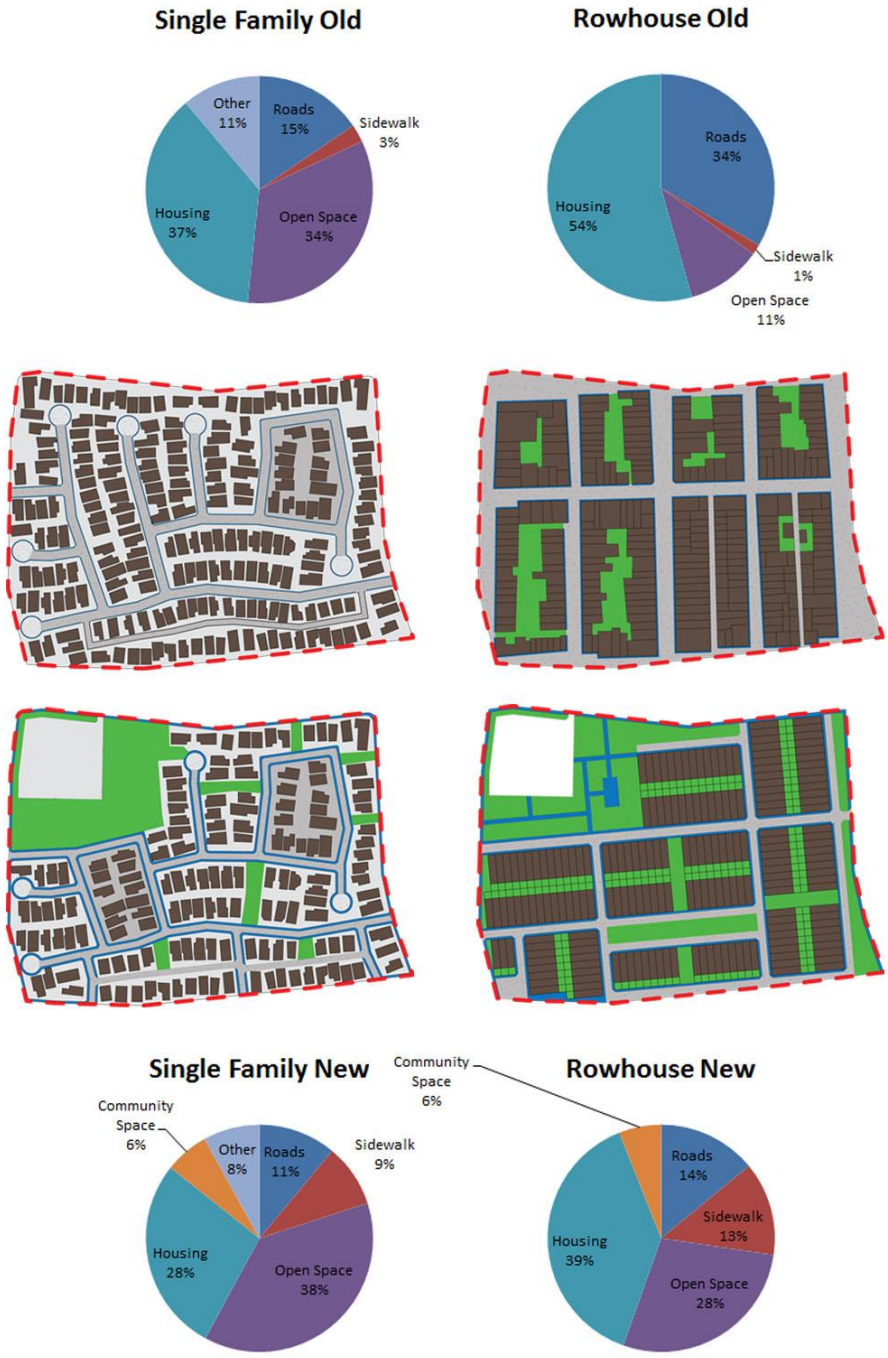


Figure 65 Visual comparison of the single-family and row house housing types. The also each have a pie chart showing exact percentages of uses on site.

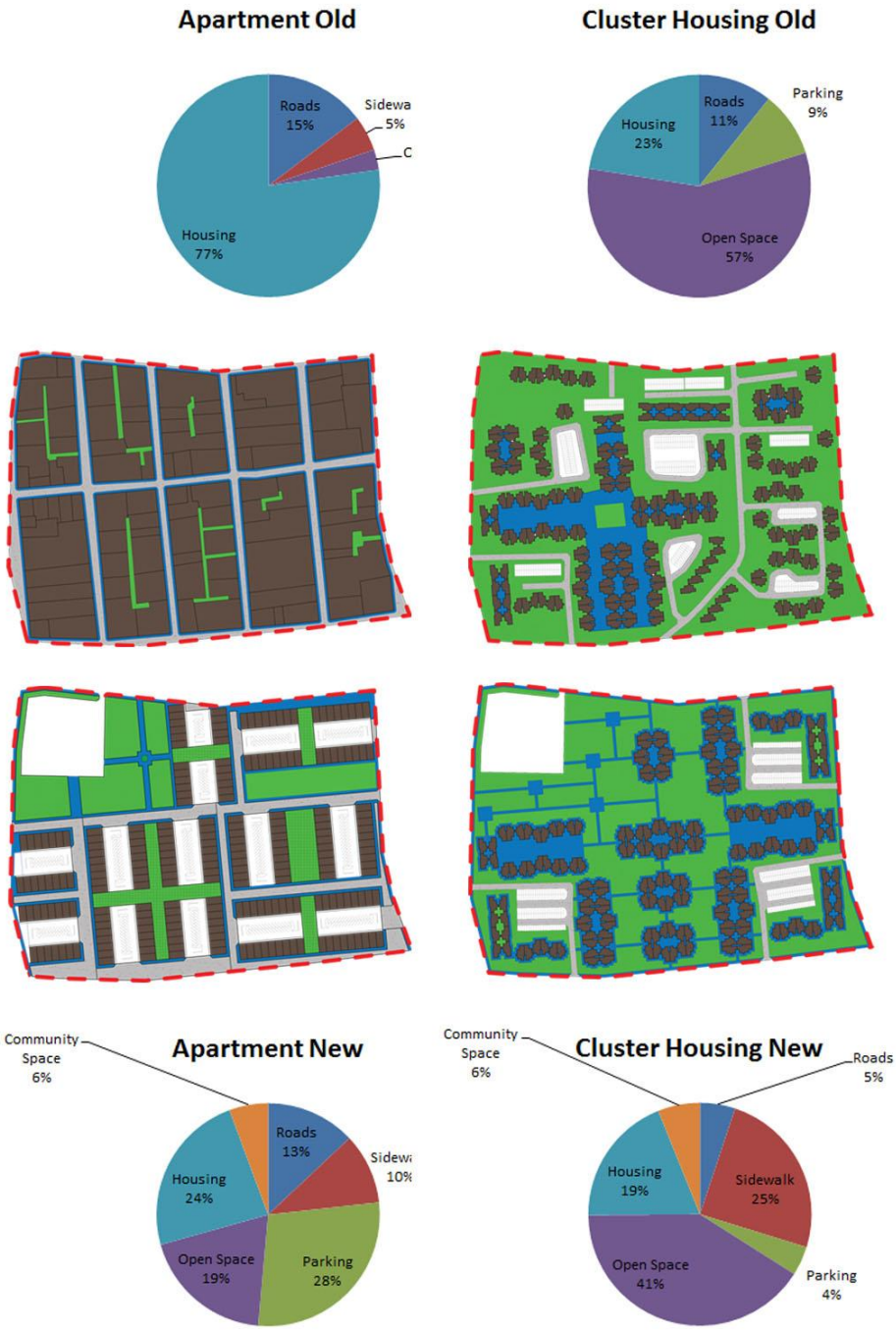


Figure 66 Visual comparison of the apartment and clustered housing types. The also each have a pie chart showing exact percentages of uses on site.

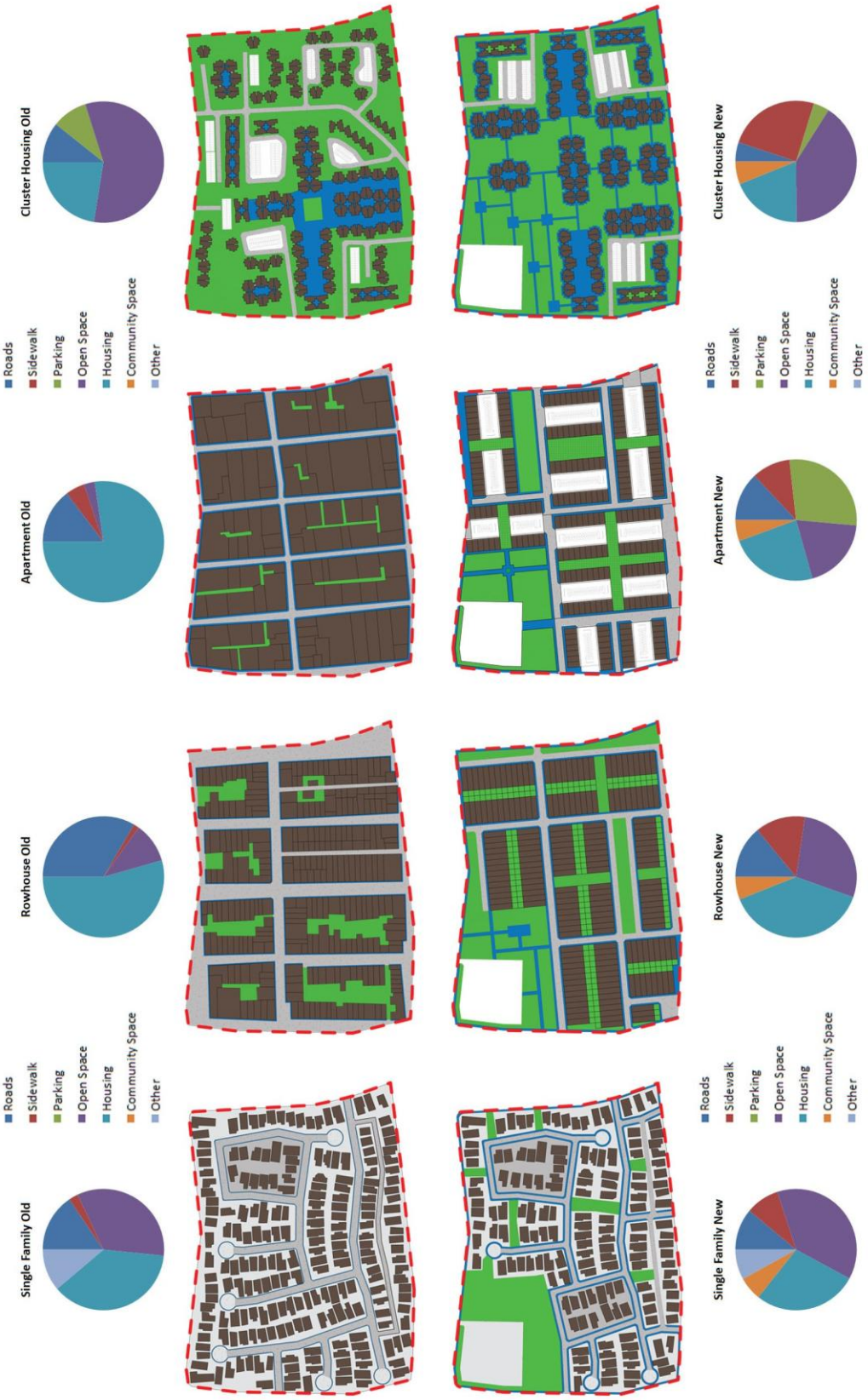


Figure 67 Comparison of all housing types and their respective critical features. We can visually see the differences in the space that housing, roads, sidewalks, and open space take up on the site.

CONCLUSION

Through this research a better understanding was provided for the housing aspect of sprawl as well as the issues of density, walkability, distance of travel, alternate transportation methods, available open space, loss of community, and traffic. Although housing development is a specific component of sprawl, it is one of the most common and critical. Instead of creating a brand new housing typology that integrates mixed uses and its own set of issues, this research applies housing typologies that are commonly seen today. This critical analysis aims to better integrate new housing developments into existing districts that utilize existing amenities and spread the idea of creating stronger, safer, and pedestrian oriented neighborhoods. How can we validate that these housing types can be affected to reduce those issues of sprawl while at the same time increasing quality of life?

With each housing morphology, the quality of life was increased to some extent. In the single-family home, the amount of nearby open space with parks that doubled as “short-cuts” through the housing blocks were increased. Making subtle gestures that would hopefully make walking a more enjoyable and convenient way of travel. The same ideas were carried out through the other housing morphologies as well. All housing types in their original state, with the exception of the clustered housing, would occupy an entire block. In some cases, there would be open space placed within the confines of those blocks, but those become more privately used spaces. What the design of each housing layout also strived, was to create a sense of community among all the residence. This cannot be achieved by reserving open and green space for private use. We must open these spaces up for the community to where many social interactions can take place. With these spaces dually acting as pathways of travel, and with their connection to on and off site amenities, we are creating space that will be used and not left to be deserted. Parents will no longer feel uncomfortable letting their younger kids go to the park to play because the park is now within walking distance as well as, in most cases, in eye sight of their home.

As a final step for validating all of this research, I have done simple calculations to compare Kapolei's total existing housing, to the potential total housing of each type we have compared in the earlier research. Currently, according to the U.S. Census for Kapolei, the total number of households as of 2010 is 3, 383. Roughly, the space this housing takes up is 560 acres. If we take each plan, and re-arrange it within the same location as the existing housing we can layout approximately twenty-one of our 27 acre plots. Using the amount of units that was able to fit on the new layouts, the total housing in Kapolei was increased for all housing types, except for the single-family home which only allowed for 3,192 units. Although, we did not account for the fact that not every replicated 27 acre plot would need a flexible community center because multiple communities would be able to feed off of one. Respectively for the row house, clustered housing plan, and apartment housing type, they totaled to 4053 units, 8240 units, and a whopping 18480 units. So with the single-family home being relatively close, we can conclude that we were indeed able to increase the quality of life, reduce sprawl, and increase the density of a city using known housing types.

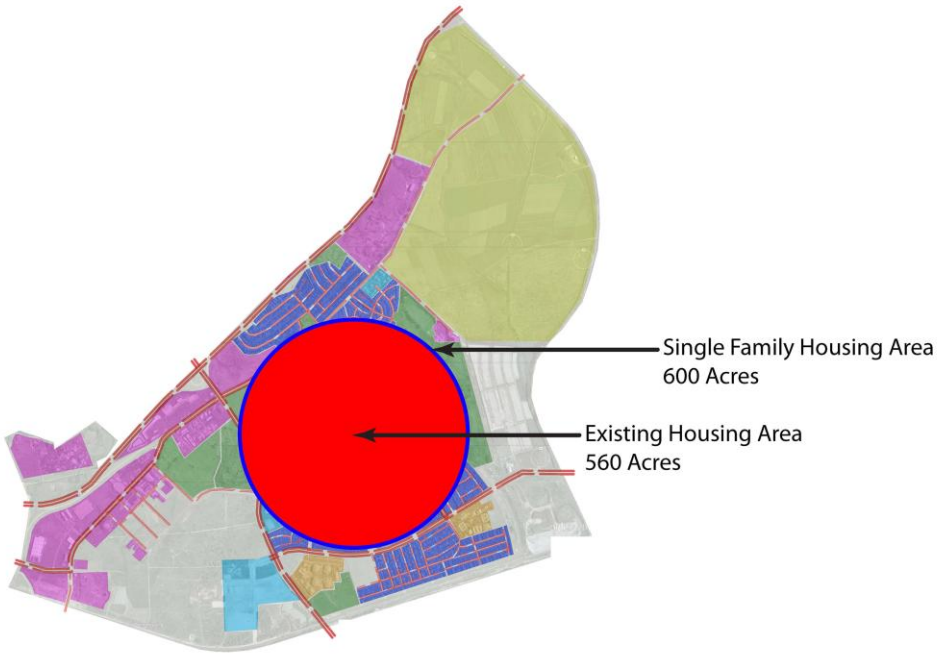


Figure 68 A diagram of Kapolei comparing the size of the existing housing and the size it would take the new single-family housing plan to accommodate 3,383 housing units.

Figure 69 A diagram of Kapolei comparing the size of the existing housing and the size it would take the new row housing plan to accommodate 3,383 housing units.

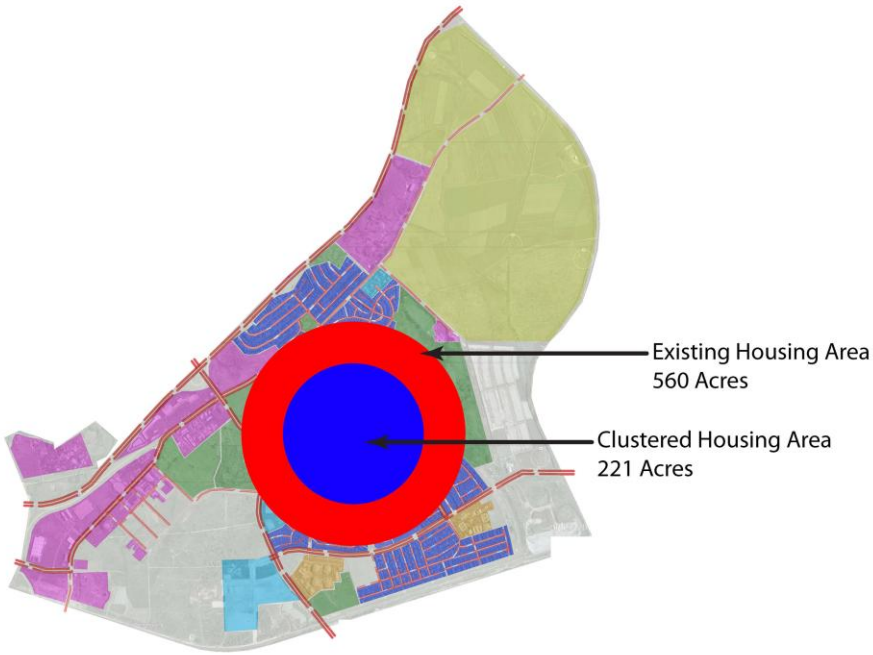


Figure 70 A diagram of Kapolei comparing the size of the existing housing and the size it would take the new clustered housing plan to accommodate 3,383 housing units.

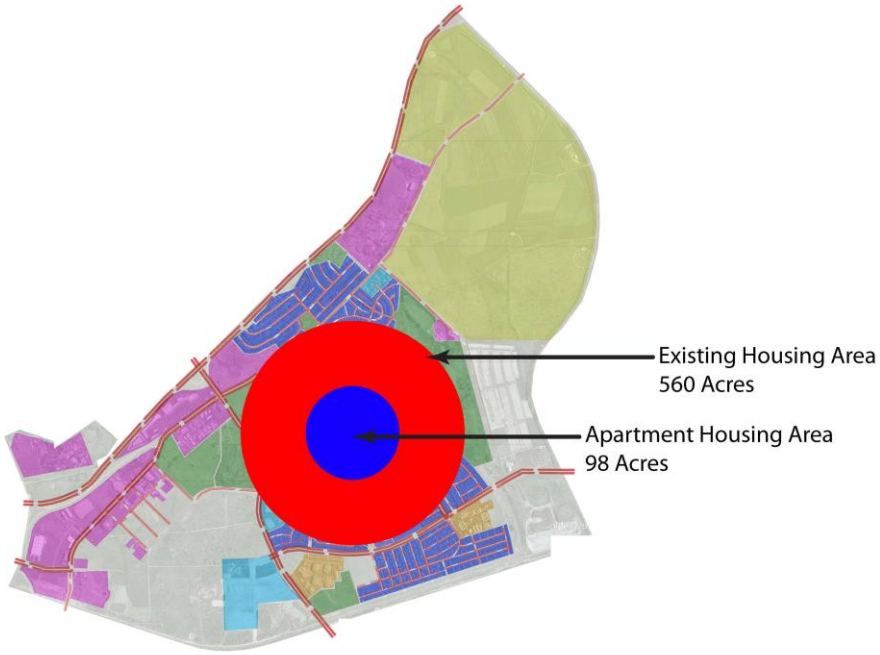


Figure 71 A diagram of Kapolei comparing the size of the existing housing and the size it would take the new apartment housing plan to accommodate 3,383 housing units.

Figures 68 – 71 give us a size comparison on each housing morphology to the existing area that Kapolei currently uses for housing. All except for the single-family housing type concluded to take up much less space to fulfill the same amount of housing units that currently exist. This would allow us to use the extra space for more housing, or introduce more amenities. These amenities could include locally owned shops, food, or better integrated civic institutions like schools.

This may not be a perfect solution for housing as they appear in urban sprawl communities, but it pushes the idea that they can be significantly improved with a better design. There is also a need to find balance within a district, the chosen site, and its surroundings in terms of density, amenities, and access throughout the site. Overall, this research paper contributes to better design, planning and integration of new development into existing cities. Rather than feed a growing problem with new development, we aim mitigate or eliminate as best we can, the design issues that contribute to urban sprawl.

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